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ABSTRACT

This document provides a detailed outline of performance objectives and test items for an introductory secondary level life science course. (SL)

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LIFE SCIENCE

PERFORMANCE OBJECTIVES AND TEST ITEMS

Science Behaviors Outline
Science Behaviors Description
Content Outline
Content/Objectives/Behaviors Grid
Performance Objectives and Test Items

First Revision

Compiled by
Sharon Stull

Norfolk City Schools
July, 1973

SE 023 118

SCIENCE BEHAVIORS

Outline

COGNITIVE DOMAIN

A.0 KNOWLEDGE

- A.1 Knowledge of scientific terminology
- A.2 Knowledge of facts
- A.3 Knowledge of classification schemes
- A.4 Knowledge of scientific techniques and procedures
- A.5 Knowledge of scientific concepts, principles, laws, and theories

B.0 COMPREHENSION

- B.1 Translation of knowledge to a new form
- B.2 Identification of knowledge in a new context
- B.3 Interpretation of knowledge, including data and observations

C.0 APPLICATION

- C.1 Solution of routine mathematical problems
- C.2 Recognition and identification of a problem
- C.3 Observation of objects and phenomona
- C.4 Measurement of objects and change
- C.5 Collection and processing of data
- C.6 Application of knowledge in new situations

D.0 ANALYSIS AND SYNTHESIS

- D.1 Formulation of an hypothesis
- D.2 Selection of suitable tests for an hypothesis and appropriate procedures for performing experiments
- D.3 Formulation of generalizations based on data and observations

PSYCHOMOTOR DOMAIN

E.0 SKILLS

- E.1 Skills in the use of common laboratory and field equipment and techniques
- E.2 Skills in mounting and preserving specimens, and in constructing graphs, charts, drawings, models, and maps
- E.3 Skills in oral expression

AFFECTIVE DOMAIN

F.0 ATTITUDES, INTERESTS, APPRECIATIONS, AND VALUES

- F.1 Manifestation of favorable attitudes toward science and scientists
- F.2 Commitment to a value system and adoption of scientific attitudes and the methods of scientific inquiry
- F.3 Enjoyment of science learning experiences
- F.4 Development of interests in science and science-related activities
- F.5 Realization of the interrelationships among the sciences, the humanities, and society
- F.6 Recognition of the historical background of science

DESCRIPTION OF SCIENCE BEHAVIORS

COGNITIVE DOMAIN

A.0 KNOWLEDGE

A.1 Knowledge of scientific terminology

Correct use and definition of scientific vocabulary.

A.2 Knowledge of facts

Recall of specific facts; for example, insects have six legs.

A.3 Knowledge of classification schemes

Ordering objects and phenomona in accordance with organizing structures established by scientists. For example, (a) Matter is classified into gases, liquids, and solids. (b) Criteria for classifying insects are a three-part body and six legs.

A.4 Knowledge of scientific techniques and procedures

This is to be distinguished from students' manual performance of laboratory techniques (a psychomotor skill) and use of procedures. It would include being able to recall and describe (a) how to use a microscope, (b) how to perform a titration, (c) how to test for starch, (d) how to determine density, etc.

A.5 Knowledge of scientific concepts, principles, laws, and theories

The acquisition and recall of the above. For example, the concept of cycles (life cycles, the nitrogen cycle), Archimedes principle, Mendel's laws, the theory of evolution, the kinetic-molecular theory.

B.0 COMPREHENSION

Comprehension of a fact, classification scheme, procedure, principle or theory is demonstrated by the students' ability to make some use of the above kinds of knowledge.

B.1 Translation of knowledge to a new form

The ability to translate information and relationships expressed in symbolic form, including maps, tables, diagrams, charts, and formulas into verbal and numerical form and vice-versa. For example: (a) A definition of density may be stated as a formula $d=\frac{m}{v}$. (b) Written material may be read, summarized, and presented orally by the student. (c) A description of forces may be put into the form of a vector diagram. (d) Chemical equations may be translated into a verbal statement that the reactions are synthesis, replacement, etc. (e) A student may be able to transform an abstract idea into

an example in everyday concrete terms or vice-versa. (f) Given the symbols, the student can explain their meaning on a weather map or a topological map or can construct such a map from given information.

B.2 Identification of knowledge in a new context

Examples: (a) Having learned the concept of cycle in relation to the water cycle, the student will identify the life stages of flowering plants from seed to seed as a cycle. (b) Having learned the criteria for classifying organisms as insects when studying honey bees, the student will recognize that grasshoppers are also insects. (c) Having learned that A + B → AB represents a synthesis reaction, the student will recognize that C + O_2 → CO_2 is also a synthesis reaction.

B.3 Interpretation of knowledge, including data and observations

Interpretation involves understanding of interrelationships and recognizing inferences from information. For example: (a) A student examines a distance vs time graph and determines whether or not a moving body is accelerating. (b) A student extrapolates from a graph or chart to predict. (c) A student reads material and determines if the data or information support the conclusion given.

C.0 APPLICATION

Application goes beyond comprehension. When a student "comprehends", he can use an abstraction or idea when its use is specified; but a demonstration of "application" shows he will use it in an appropriate situation for which no mode of solution is specified. Comprehension does not certify the ability to apply. Application is the behavior used in the first steps of problem solving. It refers particularly to application of principles to new situations.

C.1 Solution of routine mathematical problems

For example: (a) Having learned the formula for density, the student calculates it from the measurements of mass and volume. (b) the student calculates weight of product in a chemical reaction when given weight of reactants.

C.2 Recognition and identification of a problem

To sense a problem the student must recognize some sort of discrepancy, incongruity, or unanswered question.

C.3 Observation of objects and phenomona

The student makes observations which are appropriate and correct and can accurately communicate them orally or in some recorded form. The observation is qualitative only; as soon as it goes beyond simple counting and becomes quantitative, the student behavior represents category C.4 Measurement.

C.4 *Measurement of objects and changes*

The student can select, and properly use the appropriate measurement instrument with consideration for such matters as how to read a meniscus, accuracy, precision, significant figures, interpolation, estimation, how frequently to record data, etc.

C.5 *Collection and processing of data*

This includes collecting relevant data, recording it properly, assembling it in appropriate charts, graphs, tables, drawings, models, or maps, making calculations if necessary (such as correcting for daily atmospheric pressure changes), and analyzing error. This category also includes properly preserving, mounting, and labelling collected specimens, because they are field data.

C.6 *Application of knowledge in new situations*

Examples: (a) The student can predict the probable effect of a change in one factor on a biological situation (e.g. aquarium) previously in equilibrium. (b) Experimental procedures and scientific principles are applied to making a home repair. (c) Mendel's laws are applied in designing an experiment on plant genetics. (d) Without being told why, a student applies the idea of expansion because of heating to explain why there are expansion joints in bridges and roads.

D.0 *ANALYSIS AND SYNTHESIS*

D.1 *Formulation of a hypothesis. The hypothesis will give direction to an investigation and lead to D.2.*

D.2 *Selection of suitable tests for an hypothesis and appropriate procedures for performing the experimental tests*

The student selects tests which are indeed a valid test of a proposed hypothesis and selects or designs equipment and procedures so these tests can be implemented in an experiment. This behavior is not concerned with manipulative details, but with valid design of an experiment.

D.3 *Formulation of generalizations based on data and observations*

(a) The student analyzes data, develops relationships, indicates trends, determines whether or not the hypothesis is verified (b) and/or, using analyzed information from a variety of sources, he synthesizes factors in order to formulate a generalization. Example: A written report of a field, lab, or literature investigation which concludes with the students' own generalization(s).

PSYCHOMOTOR DOMAIN

E.0 SKILLS

E.1 Skills in the use and care of common laboratory and field equipment and techniques

This category deals with manipulative and manual skills. Successful achievement calls for proper care of equipment and for techniques to be performed safely and with sufficient care to achieve good results.

E.2 Skills in mounting and preserving specimens, and constructing graphs, charts, drawings, models, and maps

This psychomotor skill is concerned only with the successful manual performance of constructing the above, with no requirement for knowledge, comprehension, or other cognitive abilities.

E.3 Skills in oral expression

This refers to the student's ability to make oral presentations or communications, but does not include cognitive abilities. For example, a student may be able to present an oral report to the class, speaking clearly and with poise; however the accuracy of material, the logic, relevance, or any other cognitive aspect of the report would not be considered in judging this skill.

AFFECTIVE DOMAIN

F.0 ATTITUDES, INTERESTS, AND APPRECIATIONS

Evaluation of achievement in the affective domain is most difficult. Frequently observation by the teacher is the only way to evaluate affective behavior. Checklists lend objectivity to such observations and provide a means of recording them. Other evaluation instruments are: (1) personal discussions and interviews, (2) individual inventories, (3) student reports or term papers, (4) rating scales, (5) subjective test questions.

F.1 Manifestation of favorable attitudes toward science and scientists

This attitude is evidenced when the student speaks, writes, and acts in ways which show he places a value on the role of science in furthering man's understanding and gives due acknowledgment to scientists for their contributions in this quest. He does not denounce science as a sinister enterprise or consider scientists to be wierd people.

F.2 Commitment to a value system and adoption of scientific attitudes and the methods of scientific inquiry

Commitment to a value system could be evidenced by a student who holds a value firmly enough to stand up and defend it or whose behavior manifests his values. For example, (a) he will not hesitate to support an issue which may be unpopular with his peers, (b) he will indicate a respect for all living things and the environment.

Scientific attitudes reflect the nature of scientific inquiry and professional standards of the scientist rather than the personalities of scientists. The attitudes include honesty, open-mindedness, self-criticism, willingness to suspend judgment, and commitment to accuracy. The student whose mind is attuned to the methods of inquiry is characterized by more than mechanical performance of inquiry processes; his behaviors attest that he is personally convinced that scientific inquiry is a valuable and valid operating mode for him.

He will apply the methods and behaviors typical of scientific inquiry to the resolution of everyday problems; for example, in deciding on purchases, making decisions regarding school, interpersonal relationships, and career choice. He will perform tasks in a precise, orderly, well-organized fashion, will care properly for equipment he uses, and will work cooperatively within a group.

F.3 *Enjoyment of science learning experiences*

This category calls attention to an obviously desirable but frequently and sadly lacking aspect of school learning. The student who enjoys science learning will express his feelings clearly in words and in other ways. Teacher observations of such expressions must be employed to determine if the behavior indicates achievement of such an objective.

F.4 *Development of interests in science and science-related activities*

Two aspects of this interest are (a) activities the student does himself, particularly voluntarily, and (b) the attention he gives to ongoing science events and the societal interactions of science.

F.5 *Realization of the interrelationships among the sciences, the humanities, and society*

This category deals with the students' manifestations which indicate their awareness that (a) all sciences are interrelated, (b) the humanities and the sciences are interrelated and influence each other (science and music, art and science, etc.), (c) science influences society and vice-versa, (The attitude of government toward research funding; industrial and social needs vs. ecological considerations; etc.).

F.6 *Recognition of the historical background of science*

This refers to the history of scientific ideas and the evolutionary nature of their development, and students' recognition that the past, present, and future development of science is a reflection of the general culture of the time.

LIFE SCIENCE

Content

1.00 Exploring Our Environment
- *1.10 The Ways of a Scientist*
- *1.20 Living and Nonliving Things*

2.00 Dynamics of Living Things
- *2.10 From Basic Materials to a Living Organism*
  - *2.11 Elements Basic to All Living Things*
  - *2.12 The Cell*
- *2.20 Energy in Living Things*
  - *2.21 The Function of Energy in Chemical and Physical Reactions*
  - *2.22 The Energy Flow in Living Things*
  - *2.23 The Energy Flow Through the Community*
- *2.30 Maintaining Life*
  - *2.31 Vital Functions of the Organisms*
  - *2.32 The Continuity of Life*

3.00 Interrelationships Among Living Things
- *3.10 Individual Interrelationships*
- *3.20 Social Interrelationships*
- *3.30 Population and Community Interrelationships*

4.00 Exploring Different Environments
- *4.10 Communities*
- *4.20 Fresh Water Communities*
  - *4.21 Standing Water*
  - *4.22 Flowing Water*
- *4.30 Marine Communities*
- *4.40 Land Communities*
- *4.50 Community Changes*

5.00 Man and His Environment
- *5.10 Upsetting the Balance of Nature*
- *5.20 Pollution*
  - *5.21 Water*
  - *5.22 Air*
  - *5.23 Land*
  - *5.24 Noise*
- *5.30 Wildlife*

LIFE SCIENCE

Content/Behaviors Grid

CONTENT	OBJECTIVE	SCIENCE BEHAVIORS: Cognitive — Knowledge: Terminology (A 1)	Knowledge: Facts (A 2)	Knowledge: Classification (A 3)	Knowledge: Techniques/Procedures (A 4)	Knowledge: Concepts/Laws/Theories (A 5)	Comprehension: Translation to New Form (B 1)	Comprehension: Identify Knowledge in New Context (B 2)	Comprehension: Interpretation (B 3)	Application: Solve Math Problems (C 1)	Application: Recognize/Ident. Probl. (C 2)	Application: Observation (C 3)	Application: Measurement (C 4)	Application: Collect/Process Data (C 5)	Application: Apply Knowledge in New Situation (C 6)	Analysis, Synthesis: Formulate Hypothesis (D 1)	Analysis, Synthesis: Select Tests of Hypothesis and Procedures (D 2)	Analysis, Synthesis: Formulate Generalizations (D 3)	Psychomotor Skills: Equipment and Techniques (E 1)	Skills: Construction of Graphs, Models, Mounts, etc. (E 2)	Skills: Oral Expression (E 3)	Affective: Attitude/Interest Appreciation/Value: Attitudes toward Science (F 1)	Values, Scientific Attitudes and Methods (F 2)	Enjoyment of Science (F 3)	Interest in Science (F 4)	Interrelationships - Sci/Humanities/Soc (F 5)	Historical Background (F 6)
1.00 Exploring Our Environment																											
1.10 The Ways of A Scientist	C.3/1.10a											X															
	B.1/1.10b						X																				
	B.1/1.10c						X																				
	A.2/1.10d		X																								
	C.4/1.10e												X														
	A.1/1.10f	X																									
	C.4/1.10g												X														
	C.4/1.10h												X														
	A.2/1.10i		X																								
	B.1/1.10j						X																				
	C.4/1.10k												X														
	C.5/1.10l													X													
	B.1/1.10m						X																				
1.20 Living and Nonliving Things																											
	A.1/1.20a	X																									
	B.3/1.20b								X																		
	A.1/1.20c	X																									
	A.2/1.20d		X																								
	B.3/1.20e								X																		
	A.2/1.20f		X																								
	A.3/1.20g			X																							
	B.3/1.20h								X																		

LIFE SCIENCE

Content/Behaviors Grid

CONTENT	OBJECTIVE	SCIENCE BEHAVIORS: Cognitive — Knowledge: Terminology A 1	Knowledge: Facts A 2	Knowledge: Classification A 3	Knowledge: Techniques/Procedures A 4	Knowledge: Concepts/Laws/Theories A 5	Comprehension: Translation to New Form B 1	Comprehension: Identify Knowledge in New Context B 2	Comprehension: Interpretation B 3	Application: Solve Math Problems C 1	Application: Recognize/Ident. Probl. C 2	Application: Observation C 3	Application: Measurement C 4	Application: Collect/Process Data C 5	Application: Apply Knowledge in New Situation C 6	Analysis, Synthesis: Formulate Hypothesis D 1	Analysis, Synthesis: Select Tests of Hypothesis and Procedures D 2	Analysis, Synthesis: Formulate Generalizations D 3	Psychomotor Skills: Equipment and Techniques E 1	Psychomotor Skills: Construction of Graphs, Models, Mounts, etc. E 2	Psychomotor Skills: Oral Expression E 3	Affective Attitude/Interest Appreciation/Value: Attitudes toward Science F 1	Affective: Values, Scientific Attitudes and Methods F 2	Affective: Enjoyment of Science F 3	Affective: Interest in Science F 4	Affective: Interrelationships - Sci/Humanities/Soc F 5	Affective: Historical Background F 6
2.00 Dynamics of Living Things																											
2.10 From Basic Materials to A Living Organism																											
2.11 Elements Basic to All Living Things	B.1/2.11a						X																				
	A.2/2.11b		X																								
	B.1/2.11c						X																				
	B.2/2.11d							X																			
	A.2/2.11e		X																								
	B.1/2.11f						X																				
	B.3/2.11g								X																		
	A.2/2.11h		X																								
2.12 The Cell	A.5/2.12a					X																					
	A.2/2.12b		X																								
	A.2/2.12c		X																								
	A.2/2.12d		X																								
	A.3/2.12e			X																							
	B.3/2.12f								X																		
	B.3/2.12g								X																		
	B.3/2.12h								X																		
	B.3/2.12i								X																		

LIFE SCIENCE

Content/Behaviors Grid

CONTENT	OBJECTIVE	SCIENCE BEHAVIORS: Cognitive — Knowledge: Terminology A 1	Facts A 2	Classification A 3	Techniques/Procedures A 4	Concepts/Laws/Theories A 5	Comprehension: Translation to New Form B 1	Identify Knowledge in New Context B 2	Interpretation B 3	Application: Solve Math Problems C 1	Recognize/Ident. Probl. C 2	Observation C 3	Measurement C 4	Collect/Process Data C 5	Apply Knowledge in New Situation C 6	Analysis, Synthesis: Formulate Hypothesis D 1	Select Tests of Hypothesis and Procedures D 2	Formulate Generalizations D 3	Psychomotor Skills: Equipment and Techniques E 1	Construction of Graphs, Models, Mounts, etc. E 2	Oral Expression E 3	Affective Attitude/Interest Appreciation/Value: Attitudes toward Science F 1	Values, Scientific Attitudes and Methods F 2	Enjoyment of Science F 3	Interest in Science F 4	Interrelationships - Sci/Humanities/Soc F 5	Historical Background F 6
2.20 Energy in Living Things																											
2.21 The Function of Energy in Chemical and Physical Reactions																											
	A.2/2.21a		X																								
	B.3/2.21b								X																		
	A.2/2.21c		X																								
2.22 The Energy Flow in Living Things																											
	A.2/2.22a		X																								
	B.1/2.22b						X																				
	A.2/2.22c		X																								
	A.3/2.22d			X																							
	A.2/2.22e		X																								
2.23 The Energy Flow Through the Community																											
	E.1/2.23a																		X								
	A.3/2.23b			X																							
	B.1/2.23c						X																				
	B.3/2.23d								X																		
	B.3/2.23e								X																		
	A.3/2.23f			X																							
	D.3/2.23g																	X									

LIFE SCIENCE

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2.30 Maintaining Life																											
2.31 Vital Functions of the Organism																											
	D.3/2.31a																	X									
	A.2/2.31b		X																								
	B.3/2.31c								X																		
	A.2/2.31d		X																								
	D.3/2.31e																	X									
	A.3/2.31f			X																							
2.32 The Continuity of Life																											
	A.2/2.32a		X																								
	A.2/2.32b		X																								
	A.2/2.32c		X																								
	B.1/2.32d						X																				
3.00 Interrelationships Among Living Things																											
3.10 Individual Interrelationships																											
	A.2/3.10a		X																								
	A.3/3.10b			X																							
	A.3/3.10c			X																							
	D.3/3.10d																	X									

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3.20 Social Interrelationships																											
	A.2/3.20a		X																								
	A.2/3.20b		X																								
	B.3/3.20c								X																		
	A.3/3.20d			X																							
3.30 Population and Community Interrelationships																											
	A.2/3.30a		X																								
	B.3/3.30b								X																		
	B.3/3.30c								X																		
	A.2/3.30d		X																								
	B.3/3.30e								X																		
	D.3/3.30f																	X									
	B.3/3.30g								X																		
4.00 Exploring Different Environments																											
4.10 Communities																											
	B.1/4.10a						X																				
	B.3/4.10b								X																		
	B.1/4.10c						X																				
4.20 Fresh Water Communities																											
4.21 Standing Water																											
	A.2/4.21a		X																								
	B.1/4.21b						X																				
	B.1/4.21c						X																				
	E.2/4.21d																				X						
	A.2/4.21e		X																								

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	B.1/4.21f						X																				
	A.3/4.21g			X																							
	D.3/4.21h																	X									
	A.3/4.21i			X																							
	B.1/4.21j						X																				
	D.3/4.21k																	X									
4.22 Flowing Water	B.1/4.22a						X																				
	B.1/4.22b						X																				
	B.3/4.22c								X																		
4.30 Marine Communities	B.1/4.30a						X																				
	A.2/4.30b		X																								
	D.3/4.30c																	X									
	A.2/4.30d		X																								
	A.2/4.30e		X																								
	A.2/4.30f		X																								
	A.2/4.30g		X																								
	A.2/4.30h		X																								
	B.1/4.30i						X																				
	A.3/4.30j			X																							
	D.3/4.30k																	X									
4.40 Land Communities	B.1/4.40a						X																				
	D.3/4.40b																	X									
	A.2/4.40c		X																								
	A.2/4.40d		X																								

LIFE SCIENCE

Content/Behaviors Grid

CONTENT	OBJECTIVE	Cognitive: Knowledge: Terminology A1	Knowledge: Facts A2	Knowledge: Classification A3	Knowledge: Techniques/Procedures A4	Knowledge: Concepts/Laws/Theories A5	Comprehension: Translation to New Form B1	Comprehension: Identify Knowledge in New Context B2	Comprehension: Interpretation B3	Application: Solve Math Problems C1	Application: Recognize/Ident. Probl. C2	Application: Observation C3	Application: Measurement C4	Application: Collect/Process Data C5	Application: Apply Knowledge in New Situation C6	Analysis, Synthesis: Formulate Hypothesis D1	Analysis, Synthesis: Select Tests of Hypothesis and Procedures D2	Analysis, Synthesis: Formulate Generalizations D3	Psychomotor: Skills: Equipment and Techniques E1	Psychomotor: Skills: Construction of Graphs, Models, Mounts, etc. E2	Psychomotor: Skills: Oral Expression E3	Affective: Attitude/Interest Appreciation/Value: Attitudes toward Science F1	Values, Scientific Attitudes and Methods F2	Enjoyment of Science F3	Interest in Science F4	Interrelationships - Sci/Humanities/Soc F5	Historical Background F6
	A.3/4.40e			X																							
	A.2/4.40f		X																								
	A.2/4.40g		X																								
	A.2/4.40h		X																								
	A.2/4.40i		X																								
	A.2/4.40j		X																								
	A.2/4.40k		X																								
	D.3/4.40l																	X									
	B.1/4.40m						X																				
4.50 Community Changes	D.3/4.50a																	X									
	B.1/4.50b						X																				
	B.1/4.50c						X																				
	B.1/4.50d						X																				
	A.2/4.50e		X																								
	A.1/4.50f	X																									
	A.2/4.50g		X																								
5.00 Man and His Environment																											
5.10 Upsetting the Balance of Nature																											
	A.2/5.10a		X																								
	A.2/5.10b		X																								
	A.2/5.10c		X																								
	B.1/5.10d						X																				

LIFE SCIENCE

Content/Behaviors Grid

CONTENT	OBJECTIVE	Cognitive: Knowledge: Terminology (A 1)	Facts (A 2)	Classification (A 3)	Techniques/Procedures (A 4)	Concepts/Laws/Theories (A 5)	Comprehension: Translation to New Form (B 1)	Identify Knowledge in New Context (B 2)	Interpretation (B 3)	Application: Solve Math Problems (C 1)	Recognize/Ident. Probl. (C 2)	Observation (C 3)	Measurement (C 4)	Collect/Process Data (C 5)	Apply Knowledge in New Situation (C 6)	Analysis, Synthesis: Formulate Hypothesis (D 1)	Select Tests of Hypothesis and Procedures (D 2)	Formulate Generalizations (D 3)	Psychomotor: Skills: Equipment and Techniques (E 1)	Construction of Graphs, Models, Mounts, etc. (E 2)	Oral Expression (E 3)	Affective: Attitude/Interest Appreciation/Value: Attitudes toward Science (F 1)	Values, Scientific Attitudes and Methods (F 2)	Enjoyment of Science (F 3)	Interest in Science (F 4)	Interrelationships - Sci/Humanities/Soc (F 5)	Historical Background (F 6)
5.20 Pollution																											
5.21 Water	A.2/5.21a		X																								
	B.1/5.21b						X																				
	A.2/5.21c		X																								
	A.2/5.21d		X																								
5.22 Air	A.2/5.22a		X																								
	A.2/5.22b		X																								
	A.2/5.22c		X																								
5.23 Land	B.1/5.23a						X																				
	B.1/5.23b						X																				
	B.1/5.23c						X																				
	A.2/5.23d		X																								
	A.2/5.23e		X																								
	A.2/5.23f		X																								
5.24 Noise	B.3/5.24a								X																		
	D.3/5.24b																	X									
	B.1/5.24c						X																				
5.30 Wildlife	B.3/5.30a								X																		
	B.3/5.30b								X																		
	A.2/5.30c		X																								
	A.3/5.30d		X																								

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

*Objectives (*Minimum Objectives)*		*Activities*	*References*
	The student will:		
*C.3/1.10a	Show an understanding of the value of man's senses by identifying a variety of objects or materials through the use of one or more of the five senses.		
*B.1/1.10b	Reply negatively when asked if man's senses are always reliable and give at least two reasons to support this answer.		
*B.1/1.10c	Demonstrate ability to apply a scientific method of problem solving by identifying the problem solving steps which are exemplified in a specific scientific problem. (Redi, Spallanxani, etc.)		
*A.2/1.10d	Given drawings or actual examples of basic lab equipment, identify each by its name and use.		
*C.4/1.10e	Demonstrate skill in the use of the centigrade and fahrenheit thermometers, by accurately measuring and recording the temperature of a liquid at stated intervals with both thermometers.		
*A.1/1.10f	Given a drawing of a microscope, correctly identify the following parts: eyepiece, tube, arm, low power objective, high power objective, fine adjustment, course adjustment, nosepiece, stage, clips, diaphragm, mirror, and base.		
*C.4/1.10g	Demonstrate skill in use of the microscope that includes safe carrying of a microscope and orderly procedure for focusing.		
*C.4/1.10h	Demonstrate correct procedure in preparing, handling, and cleaning a slide, by correctly preparing, handling, and cleaning a wet mount in the presence of teacher.		

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

*Objectives (*Minimum Objectives)*		*Activities*	*References*
	The student will:		
*A.2/1.10i	Cite the approximate English equivalents for the following metric units: (a) meter, (b) kilogram, and (c) liter.		
*B.1/1.10j	Display comprehension of the numerical value of centi, milli, and kilo, by charting each with gram, liter, and meter and stating the numerical value of each unit.		
*C.4/1.10k	Use the metric system to determine volume in ml, mass in grams, and length in centimeters, by correctly measuring the length of 2 objects, the weight of 2 objects, and the volume of 2 objects.		
*C.5/1.10l	Demonstrate ability to observe and record data by correctly graphing data from at least two activities of the teacher's selection.		
*B.1/1.10m	Write a report showing how a famous scientist used open-minded, objective observations in contributing to man's knowledge.		

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number | *Test Item*

C.3/1.10a 1. (a) Identify the objects in a box while blindfolded: rubber ball, jacks, dice, spoon, seashell, tissue, wrapped chewing gum, rock, cooked macaroni.
(b) Identify three clear, colorless liquids by smell: water, ammonia, vinegar.

Subordinate Test Item

1. List five (5) senses of man and give an example of man using each.
   1) _____ : _____
   2) _____ : _____
   3) _____ : _____
   4) _____ : _____
   5) _____ : _____

2. Which five senses are used to get information in each of the following situations?
   _____ a. The color of the walls in the room.
   _____ b. Salty food.
   _____ c. A book dropped on the floor.
   _____ d. A warm classroom.
   _____ e. Gas leaking into the classroom.
   _____ f. A rough object.

3. Sample True-False Test Items
   (a) (True or False) _____ Observations may involve more than one of our senses. Explain your answer.
   (b) (True or False) Our senses are valuable. _____ Explain your answer.

B.1/1.10b 1. Man's senses are:
A. always reliable
B. never reliable
C. sometimes reliable
D. rarely reliable
State two examples which support your answer.

2. (True or False) Our senses are not always reliable._____ Explain your answer.

LIFE SCIENCE

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

3. The teacher will provide several optical illusions and ask the students to answer questions about each. For example: >—A—< <—B—> Which line is longer, A or B? _____. At the end of the drawings give the following questions: Are man's senses always reliable? Give 2 reasons to support your conclusion.

B.1/1.10c 1. Below are steps used in a scientific method. Arrange the steps in order by numbering 1 through 5.

_____ Conclusion
_____ Experiment
_____ Problem
_____ Hypothesis (Possible Answer to Problem)
_____ Observation and recording data

2.

1. problem	5. control	9. theory
2. scientific method	6. test	10. spontaneous generation
3. superstition	7. hypothesis	11. law
4. observation	8. fact	12. variable

While there are many kinds of problems which can be solved by planned experiments, most of them can be solved by following certain steps or stages which we call a scientific method.

1. What is the first step? _____
2. What is the second step? _____
3. What is the third step? _____
4. What is the fourth step? _____
5. What is the fifth step? _____
6. What is the sixth step? _____

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

3. Observe the following lists, and determine which is the logical sequence that represents a scientific method. Place the letter which represents the correct list on the blank at the left.

A	B	C
Recognize and define problem	Research	New Hypothesis
Collect related data and information	Conclusion	Research
Hypothesis	Hypothesis	Research
Experiment	Research	Conclusion
New Hypothesis	New Hypothesis	Hypothesis
Research	Conclusion	Conclusion
Conclusion		

4. Use the steps the scientists use to solve two of the following problems. State each step and explain what you would do or did.
   1. Your model plane comes down in a tree..It is a large tree, a tall old oak tree..The plane has landed very high on a small branch below a large sturdy branch. The tree is too big to shake. You cannot reach it.

   2. Some people believe that handling toads will cause warts. How would you prove whether or not this belief is true?

   3. State one of your most difficult problems you have had in adjusting yourself to your new daily life schedule and list the methods you have or are using to solve the problem. Use the steps that a scientist would use.

A.2/1.10d 1. The teacher will provide drawings or actual examples of basic lab equipment. The student will match the number of the piece of equipment with its name and its use from lists provided.

2. When shown numbered pieces of lab equipment, put name beside number and give one use for each piece.

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

C.4/1.10e 1. Accurately measure and record the temperature of a liquid being heated at a constant temperature, at 3 minute intervals using both the fahrenheit and centigrade thermometers. Complete this chart during your investigation.

Time Passed	Fahrenheit	Centigrade
0 Min.	____ °F	____ °C
3 Min.	____ °F	____ °C
6 Min.	____ °F	____ °C
9 Min.	____ °F	____ °C
12 Min.	____ °F	____ °C
15 Min.	____ °F	____ °C

A.1/1.10f 1. Given a drawing of the microscope, label the parts indicated.

2. Given a drawing of the microscope and a list of the parts, match the parts with the numbers on the drawing.

3. Given a drawing of the microscope, look carefully at the labeling of this microscope, then beside each number write the name of the part of the microscope. Tell what the part is used for.

Subordinate Test Item

1. Given the following drawing of a microscope, identify by letter (on the drawing) the following parts:
   A. The part which contains the lenses
   B. The part which reflects light
   C. The part which controls the amount of light
   D. The part which holds the slides in place
   E. The delicate adjustment
   F. The coarse adjustment
   G. The high power objective

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1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number | *Test Item*

2. Place the correct letter from the item in Column B in the space next to the item in Column A.

Column A		Column B
1. _____	a rugged, optical instrument	a. base
2. _____	part on which the microscope is mounted	b. ocular
3. _____	the position of the microscope when carried	c. upright
4. _____	the 2 types of lenses in the optical system	d. magnification
5. _____	holds the eyepiece	e. clips
6. _____	an object is -- when viewed through the lenses	f. coarse adjustment
7. _____	the most often used objective	g. microscope
8. _____	holds the specimen	h. tube
9. _____	holds the specimen/slides in place	i. mirror
10. _____	a symbol that means ten times	j. low power
11. _____	used to change the position of the objectives	k. 10x
12. _____	adjustment used to focus the microscope	l. diaphram
13. _____	controls the amount of light to be used	m. stage
14. _____	used to reflect the light	n. nosepiece
		o. objective lens

3. Sample Multiple Choice Items

(a) _____ To magnify an abject is to
- a. make it smaller
- b. make it transparent
- c. make it breathe
- d. none of the above

(b) _____ A microscope is valuable to a scientist because
- a. it is expensive
- b. it makes things look larger
- c. it is sturdy
- d. it is made of solid metal

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

C.4/1.10g 1. List 5 ways in which your teacher is incorrectly using the microscope. (Teacher demonstrate)

2. The student correctly focuses a slide in the presence of the teacher. A checklist for student evaluation should be made by teacher for grading

Subordinate Test Item

INSTRUCTIONS: Write the word "TRUE" or the word "FALSE" in the blank in front of each statement.

_____ 1. You should use the high power before the low power objective.
_____ 2. The fine adjustment knob usually is turned a lot to get the image in focus.
_____ 3. You may tilt back the microscope when viewing a wet mount.
_____ 4. To raise the tube move the coarse adjustment toward yourself.
_____ 5. Lower the low power objective while looking through the eyepiece.
_____ 6. Always begin focusing an image in low power.
_____ 7. Pick up the microscope with one hand grasping the arm and the other hand under the base.
_____ 8. If you wish to look at something on the lower edge of the slide, push the slide away from you.
_____ 9. Always place the microscope on a level surface that is cleared of books and materials.
_____ 10. If you wish to see something on the left side of the slide move the slide to the left.
_____ 11. Lenses are cleaned with a special lens paper.
_____ 12. The diaphragm would be in position number 4 for the smallest amount of light being allowed through the hole in the stage.

C.4/1.10h 1. Student checked by teacher on correct procedure in preparing, handling, and cleaning a wet mount. It is recommended teacher make a checklist before she (he) begins checking.

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

Subordinate Test Items

1. The 3 general methods of preparing slides are:

	Name	Purpose (Use)	Duration(of slide)
1.			
2.			
3.			

2. Preparing A Slide:
Directions: Arrange the statements in sequential order according to type of slide to be prepared. Record answers in the column(s) below. (First select the topics related to the title.) Teacher should provide adequate space for answers.

Dry Mount	Wet Mount

Statements:
1. cleaned the slide
2. put the slide over the opening in the stage
3. placed the specimen on the slide (center)
4. placed the clips in place
5. placed a drop of water on the slide
6. put water on the specimen
7. placed specimen in the water
8. added a cover slip

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 **Topic:** The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

3. Place the correct number from the list below on the blank before the correct letter:

_____ a slide used for months or years
_____ produces slides of fluids
_____ a stain used on slides
_____ material placed on slides to observe
_____ a glass the specimen is placed on to be observed
_____ What can be done to the specimen for the observer to see it better?
_____ a very small square of plastic or glass used to cover the specimen
_____ What kind of materials are usually used when wet mounts are used?
_____ What is the wet mount called that allows you to observe a very thin membrane?
_____ What condition should equipment used be in to prepare good slides?

1. magnification
2. temporary
3. permanent mount
4. smears
5. wet mounts
6. tissue mounts
7. organism
8. clean
9. methylene blue or dilute iodine solution
10. living materials
11. specimen
12. patience
13. stains
14. slide
15. cover slip or cover glass
16. 10x objective lens
17. microscope
18. smears
19. permanent mounts
20. 43x objective lens

A.2/1.10i 1. Complete the following:
1. The English equivalent of a meter is _____.
2. The English equivalent of a kilogram is _____.
3. The English equivalent of a liter is _____.

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number — *Test Item*

B.1/1.10j 1. Complete the following chart:

	Weight	Volume	Length	Numerical Equivalent
Standard Unit	gram	liter	meter	----------
centi	centigram			1/100
milli		milliliter		
kilo			kilometer	

Subordinate Test Items

1. Arrange the following in order of size, smallest first:
   meter kilometer millimeter centimeter

2. Sample Multiple Choice:
   A millimeter is:
   A. 1/10 of a meter
   B. 1/2 of a meter
   C. 1/1000 of a meter
   D. 1/100 of a meter

3. State the correct PREFIX:
   1/100 liter = 1 _____ liter
   1000 liter = 1 _____ liter
   1/1000 meter = 1 _____ meter

   State the correct NUMBER:
   650 centimeters = _____ meters
   875 centiliters = _____ liters
   3500 millimeters = _____ meters

4. Tell what each of the PREFIXES means:
   milli means _____ (fraction) or _____ (decimal)
   centi means _____ (fraction) or _____ (decimal)
   Kilo means _____

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1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

5. Complete the following by stating the correct n-mber:
1 meter = _____ centimeter = _____ millimeter

C.4/1.10k 1. Complete this laboratory exercise using metric ruler, triple-beam balance, and graduated cylinder.

Part I Measuring length, area, and volume of science book

length (cm)	width (cm)	thickness (cm)	area (cm)	volume (cm)

Area = length x width = cm
Volume = length x width x thickness = cm

Part II Weighing in the metric system (nut, bolt, pencil, beaker)

Object	weight
bolt or nut	gm
pencil	gm
beaker	gm
beaker + 100 ml H_2O	gm

Part III Determining the volume of an irregular object

water	ml
water and nut or bolt	ml
nut or bolt	ml

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

Subordinate Test Item

1. From the set of 5 instruments in Column I, select the best instrument to measure the item in the metric system in Column II. Write the letter of this term in the space at right.

Column I	Column II	
A. Balance	1. Length of your table	_____
B. Graduated cylinder	2. Weight of a block of wood	_____
C. Measuring cup	3. Mass of 20ml of water	_____
D. Metric Ruler	4. 20ml of water	_____
E. Yard Stick	5. Your height	_____

2. Sample Multiple Choice Items

(a) _____ Which of the following is not a metric unit:
A. liter C. meter
B. gram D. pound

(b) _____ The unit of length in the metric system is the:
A. gram C. yard
B. liter D. meter

(c) _____ In the metric system, the standard unit of liquid volume is the:
A. gram C. meter
B. quart D. liter

(d) _____ In the metric system, the unit for weighing materials is the:
A. centimeter C. meter
B. gram D. ounce

(e) _____ In metric units, the length of a pencil would most likely be expressed in:
A. milligrams C. meters
B. centimeters D. centiliters

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1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

(f) _____ In metric units, the mass of a small object, such as a wooden block, would most likely be expressed in:

A. pounds
B. grams
C. ounce
D. kilograms

(g) _____ The unit of weight in the metric system would be:

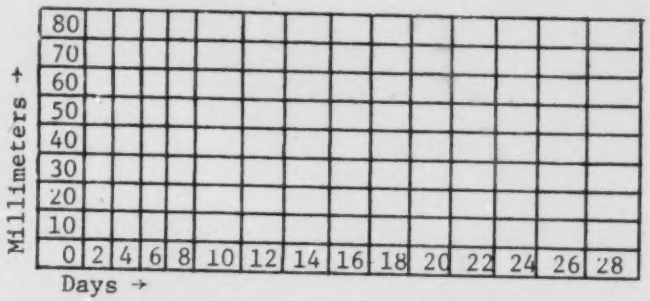
A. the ounce
B. the gram
C. the meter
D. the liter

3. List the basic units of the metric system for:
Volume: _____ weight: _____ length: _____

C.5/1.101 1. (a) Use the following records made from the observations of a developing corn seed and chart them on the graph.

Oct. 10 planted seeds
Oct. 18 plants broke ground
Oct. 20 largest 3/4 inch
Oct. 22 largest 1 inch
Oct. 24 largest 2 inches
Oct. 26 largest 3 inches

NOTE: Using the ruler convert the inch measurements into millimeters.



(b) Graph a human growth rate given the following data:

Age	Height	Weight
_____	_____	_____
_____	_____	_____
_____	_____	_____

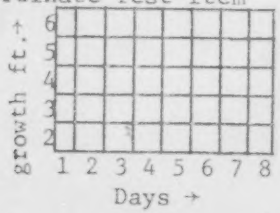
Teacher should supply the data.

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.10 Topic: The Ways of A Scientist

Subtopic/Specifications/Content Number	*Test Item*

2. From the following data, make a CHART AND A LINE GRAPH.
at 6 a.m. 40 F at 10 a.m. 60 F at 2 p.m. 65 F
at 6 p.m. 60 F at 10 p.m. 50 F

Subordinate Test Item
1.



The data recorded in the graph above indicates that on the fourth day the plant had grown to:
(a) 4 feet
(b) 2 feet
(c) 3 feet
(d) 5 feet

B.1/1.10m 1. Write a report showing how a scientist (teacher specified list) used open-minded, objective observations in his investigations.

Subordinate Test Item
1. Describe what an "open-minded, objective observation" is.

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.20 Topic: Living and Nonliving Things

Objectives (*Minimum Objectives)		*Activities*	*References*
	The student will:		
*A.1/1.20a	Define the 2 terms, stimulus and response, by explaining their meaning and giving an example for each.		
*B.3/1.20b	Demonstrate the relationship of the two terms, stimulus and response, by identifying from a given list at least 5 examples of stimulus-response situations.		
*A.1/1.20c	Define the term, reproduction, by explaining the meaning and giving at least 2 examples.		
*A.2/1.20d	State the reproductive method of at least three living things from a given list.		
*B.3/1.20e	After grouping data, illustrating the growth rates of particular plants and animals over a prescribed amount of time, conclude that a characteristic of all living things is growth.		
*A.2/1.20f	From a list of activities, select five which are characteristics of all living things.		
*A.3/1.20g	Given a list of living and non-living things, correctly choose those which are living.		
*B.3/1.20h	Explain in a paragraph why a non-living thing may appear to grow, reproduce, move, etc. and still not be considered alive unless it does all of these.		

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.20 Topic: Living and Nonliving Things

Subtopic/Specifications/Content Number	*Test Item*

A.1/1.20a 1. Define the following and give an example to illustrate each definition: response, stimulus.

Subordinate Test Item
1. What does the term "respond to stimuli" mean?

B.3/1.20b 1. RESPONSES AND STIMULI
Directions: Living things respond to outside and inside changes. When there are changes in the environment, plants and animals show one or more responses to the change. They do something. Listed below are some examples of responses. Match the response caused by the stimulus. The first one is done for you.

c	1. bright light	a.	animal runs or fights
_____	2. dim light	b.	heavy breathing, animal jumps, runs
_____	3. loud sound	c.	eyes blink, animal may run away
_____	4. soft sound	d.	eyes open wide
_____	5. rough, sharp or hot	e.	animal spits, runs away
_____	6. object on skin	f.	animal licks lips, swallows, mouth waters
_____	7. good taste	g.	animal soothed, may doze
_____	8. bad taste	h.	animal hurt-moans, screams

2. Give the missing response or stimulus:

	Stimulus	Response
1.	_____	A flower moves toward the sun
2.	Dust in your nose	_____
3.	_____	Downward growth of roots
4.	_____	Shivering
5.	_____	Venus Fly Trap Closing
6.	Bright light	_____
7.	Someone pops a paper bag behind you	_____

A.1/1.20c 1. Define the term reproduction and give at least 2 examples that illustrate this life activity.

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1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.20 Topic: Living and Nonliving Things

Subtopic/Specifications/Content Number	*Test Item*

A.2/1.20d 1. Forms of Reproduction
Directions: For each form of life in Column I, tell in Column II the method of reproduction used.

Column I	Column II
Mushroom	_____
Molds	_____
Amoeba	_____
Paramecium	_____
Flatworm	_____
Grapefruit	_____
Strawberry	_____
Yeast	_____
Irish potato	_____
Tulip	_____
Willow Twig	_____
Sugar Cane	_____
Roses	_____
Geranium	_____
Grasses	_____

B.3/1.20c 1. Describe an activity that you did to show that living things grow. (Answer varies)

A.2/1.20i 1. Place a check (✓) next to the activities that are characteristics of living things:
(a) response to stimuli
(b) rolling down a hill
(c) food digestion
(d) waste removal
(e) food getting
(f) locomotion
(g) growth
(h) not responding to stimuli
(i) reproduction

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.20 Topic: Living and Nonliving Things

Subtopic/Specifications/Content Number	*Test Item*

2. Underline the 5 activities that are characteristic of living things: growth, reproduction of own kind, breaking, digestion, melting, respond to stimuli, magnetic, produce electricity, remove waste materials, roll when touched.

3. Observing life functions: Certain life functions are hard to observe in nature because there is little outside evidence that they are taking place. However, others are more evident. You can see the function or the direct result of it. Fig. 1 shows a scene in nature as you might walk into it. Study the plants and animals, then list them and the functions evident in the spaces below. (Teacher supplies the drawing.)

Subordinate Test Item

1. Directions: Using the list of functions below, determine which function goes with each of the life processes listed in the chart. Place the correct number in the function column.

1. getting food
2. changing food
3. carrying food
4. taking-in of food
5. using food
6. process by which gases are exchanged
7. process of reacting to outside stimuli
8. getting rid of wastes
9. special materials that help cells to act
10. ability to exchange position
11. passing life from 1 generation to the next

LIFE PROCESSES	Function
Reproduction	
Secretion	
Sensation	
Motion	
Excretion	
Assimilation	
Respiration	
Circulation	
Absorption	
Digestion	
Food getting or production	

LIFE SCIENCE

1.00 UNIT: EXPLORING OUR ENVIRONMENT
1.20 Topic: Living and Nonliving Things

Subtopic/Specifications/Content Number	*Test Item*

A.3/1.20g 1. Directions: Determine which of the following in the list below are living and which are non-living forms of matter. Write an L in the blank to represent the living and an N to represent the non-living.

_____ carbon	_____ hair
_____ milk	_____ sand
_____ trees	_____ horses
_____ ameba	_____ hairpin
_____ cell	_____ airplane

2. Tell which things are living and which are non-living
   1. carrot
   2. sand
   3. flowers
   4. water
   5. frog
   6. cactus
   7. rock
   8. chair

B.3/1.20h 1. Explain in several sentences why a non-living thing may move, grow, and increase in size but is not a living thing.

2. Why can a ball or salt crystal grow, move, bounce, dissolve, or break, yet not be alive?

3. Write a short paragraph discussing according to function how one can determine if something is living or non-living.

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to a Living Organism

Objectives (*Minimum Objectives)		*Activities*	*References*
2.11 Elements Basic to All Living Things			
	The student will:		
*B.1/2.11a	Differentiate between elements, compounds, and mixtures using examples and definitions.		
*A.2/2.11b	Correctly identify from a list carbon, hydrogen, nitrogen, and oxygen as the four elements of which most living things are composed.		
*B.1/2.11c	Conclude that all organic matter contains carbon and give at least one reason that supports this conclusion.		
B.2/2.11d	Demonstrate the ability to interpret a given formula by making a model of a molecule, color coded to different elements.		
*A.2/2.11e	Cite water, protein, and carbohydrate as the three compounds found in living things.		
B.1/2 11f	Recognize the tests that indicate the presence of water, protein, sugar, starches, and fats in living things.		
*B.3/2.11g	Given the formulas for an amino-based and a sugar-based compound, compare the two kinds by listing at least one difference and one similarity between these complex molecules.		
*A.2/2.11h	Choose from a list provided those substances of which protoplasm is composed and arrange them in order of greater to lesser amount.		

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to a Living Organism

Subtopic/Specifications/Content Number | *Test Item*

2.11 Elements Basic to All Living Things

B.1/2.11a 1. Complete the following paragraph: (Elements, compounds, mixtures)
_____ have atoms that are all of one kind. For example, the _____ carbon would have all carbon atoms. A _____ is always composed of more than one element, chemically combined. The parts of a _____ are always in the same ratio, for example water is always two parts hydrogen (20 atoms) and one part oxygen (10 atoms). However, the parts of a _____ do not always have to be the same, ie.e, have the same ratio of elements. Also, the parts of a _____ can be separated much easier than the parts of a compound can be separated.

2. Name the following if the name is not given and tell whether each is an element, a compound, or a mixture.

1. $C_6H_{12}O_6$
2. O_2
3. H_2O
4. NaCl
5. Smoke
6. H_2
7. Air
8. Blood

3. Multiple choice: Put the number of the correct choice in the blank beside the question.

_____ 1. Which of the following is <u>not</u> an element (1) silver (2) water (3) hydrogen (4) oxygen.

_____ 2. Which of the following is <u>not</u> a mixture (1) carbon (2) salt water (3) protoplasm (4) sugared tea (5) nitrogen.

_____ 3. Which of the following is <u>not</u> a compound (1) water (2) silver nitrate (3) oxygen (4) sugar.

Subordinate Test Items

1. Elements - Behind each symbol write the element name; behind each element write the symbol.

Ca	Oxygen
N	Carbon
Hg	Iron
H	Sulfur

Behind each compound tell how many atoms are indicated.

$CuCl_2$	CCl_4
HNO_3	$Ni(OH)_2$
Ag_2O	

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to a Living Organism

Subtopic/Specifications/Content Number	*Test Item*

2.11 Elements Basic to All Living Things

2. Complete:
   (a) All _____ and _____ things are made up of elements, compounds, and mixtures.
   (b) _____, _____, and _____ are the 3 states of matter.

3. Match the word meanings at the left with the right word from the list at the right by writing the letter of the correct match on the line to the left of the number.

_____ 1.	Has a definite volume but no definite shape.	A. Solid
_____ 2.	The smallest part of an element.	B. Atom
_____ 3.	An atom which is not neutral because it has an electric charge.	C. Electron
_____ 4.	Form of an element which gives off energy.	D. Radioactive
_____ 5.	Anything that takes up space or has mass.	E. Mixture
_____ 6.	The smallest part of a compound which still has the properties of the compound.	F. Organic
_____ 7.	Compound making up most of living material.	G. Matter
_____ 8.	Compounds containing carbon which are or once were alive.	H. Compound
_____ 9.	Part of an atom which takes part in a chemical change	I. Liquid
_____ 10.	Has a definite shape and volume.	J. Water
_____ 11.	Elements chemically combined in a substance which cannot easily be broken up.	K. Ion
_____ 12.	Groups of atoms which are not chemically combined.	L. Molecule

A.2/2.11b 1. DIRECTIONS: Below is a list of 10 elements. Circle those four elements of which most living things are composed (made up of).

1. hydrogen
2. iron
3. sulphur
4. oxygen
5. calcium
6. iodine
7. nitrogen
8. sodium
9. phosphorus
10. carbon

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*
2.11 Elements Basic to All Living Things	

Subordinate Test Item

1. True or False: _____ The most important elements in living cells are hydrogen, oxygen, carbon, and nitrogen.

2. Fill in the blanks in the sentence below.
   All living things are composed mainly of the following four elements: _____, _____, _____, and _____.

3. Of the following elements which one is not one of the main elements found in all living things: (1) carbon (2) mercury (3) nitrogen (4) oxygen.

B.1/2.11c 1. Fill in the blank and explain your answer
(a) All organic matter contains the element _____.
(b) Organic compounds are different from inorganic compounds because _____
_____.

Subordinate Test Items

1. Sugar is an organic compound because the residue remaining after the addition of sulfuric acid was shown to be _____.

2. The main organic compounds in protoplasm are fats, carbohydrates, proteins, and nucleic acids. True or False.

3. In the space below name two organic compounds and two inorganic compounds. For each one tell what it is made of and why it is needed by living things

4. There are two classes of matter found on the earth: the organic substances, which are produced by body activities of plants and animals; and the inorganic substances -- the earth's atmosphere, rocks, and minerals that were present before life appeared.

LIFE SCIENCE

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*

2.11 Elements Basic to All Living Things

Which group contains examples of only organic matter?

_____ a. hair, glass, steel, paper
b. paper, sand, salt, wool
c. hair, starch, sugar, wood
d. steel, salt, rubber, wool

Which group contains examples of only inorganic matter?

_____ a. water, sugar, salt, pepper
b. onion, water, celery, milk
c. milk, rubber, iron, copper
d. air, glass, copper, water

B.2/2.11d 1. From the following list select any three formulas and draw a model of the molecule that is color coded for different elements. (Teacher provides an illustrative example).

$C_6H_{12}O_6$	NaCl	NH
H_2O	H_2SO_4	HNO_3
CO_2	NaOH	HCl

Teacher may use this same test item by having students construct models instead of drawing.

A.2/2.11e 1. Circle those compounds found in all living things:

protein	sulfuric acid
copper sulfate	paper clips
rubber	carbohydrate
water	plastic

B.1/2.11f 1. Match up the element or compound with the test used to identify its presence in food. Tests may be used more than once.

_____ carbon
_____ hydrogen
_____ oxygen
_____ nitrogen
_____ fats
_____ proteins
_____ sugars
_____ starches
_____ water

A. After heating, substance turns black
B. Turns black or dark blue when iodine is added
C. While heating, wet red litmus paper turns blue
D. Turns yellow or green when nitric acid is added
E. Turns yellow or yellow-orange when Benedicts solution is added
F. After heating, moisture forms on test tube
G. Leaves a greasy or oily look when rubbed on paper

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*

2.11 Elements Basic to All Living Things

Subordinate Test Item

1. Sample Fill in the Blanks

   (a) When drops of an iodine solution is added to pure starch boiled in water or a slice of potato the white starch solution and the potato changes to a dark blue color. This is a test for _____.

   (b) When equal amounts of milk and Benedict's solution are heated the results is a change in color to green, yellow, and red. This is a test for _____.

2. Sample Multiple Choice Items

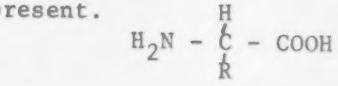
   (a) _____ When nitric acid was added to a substance and it turned yellow and then turned orange when ammonium hydroxide was added to the washed material, you were testing for (1) protein (2) calcium (3) distilled water (4) salt.

   (b) _____ When you test for starch, the liquid you use is (1) distilled water (2) iodine (3) silver nitrate (4) hydrogen peroxide.

   (c) _____ When some material is rubbed on a glazed, white piece of paper and a grease spot is noticed in front of a light, this is a test for (1) protein (2) mineral (3) fat (4) carbon.

   (d) _____ When Benedict's solution is added to a solution and it turns orange-yellow, you have found the presence of (1) fat (2) carbon (3) protein (4) starch (5) simple sugar.

B.3/2.11g 1. This is the basic formula for an amino acid. List the four basic elements present.



(1) _____ (2) _____

(3) _____ (4) _____

This is the basic formula for a sugar based acid. List the three basic elements present.

$C_6H_4OHCOOH$

(5) _____ (6) _____ (7) _____

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*
2.11 Elements Basic to All Living Things	

(8) What is the element that is not present in both? _____

(9) What elements are present in both? _____ _____ _____.

Subordinate Test Item

1. Under the correct heading below select from the following list of elements which elements are found in sugar based compounds and which are found in amino-based compounds.
   Elements: Iron, chlorine, carbon, calcium, zinc, sodium, oxygen, nitrogen, potassium, phosphorus, hydrogen, helium.

Sugar-based Compounds	Amino-based Compounds

A.2/2.11h 1. Directions: Below is a list of substances which make up protoplasm. Arrange them in order from greater to lesser amounts by putting numbers beside each starting with No. 1 for greatest, 2 for next greatest and so on.

2 carbon	8 chlorine	1 oxygen	4 nitrogen
6 Potassium	5 phosphorus	3 hydrogen	7 sulfur

This item may also be used for the compounds that comprise protoplasm.

Subordinate Test Item

Circle best answer.

1. All living matter is made up of a complicated mixture of elements and compounds called:
   (a) cellulose (c) elements
   (b) protozoa (d) protoplasm

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to A Living Organism

Objectives (*Minimum Objectives)		Activities	References
2.12	The Cell		
	The student will:		
*A.5/2.12a	Cite the parts of the Cell Theory and give the meaning and importance of each.		
*A.2/2.12b	Label the cytoplasm, nucleus, vacuole, and membranes of the cell when shown pictures, drawings, or slides.		
*A.2/2.12c	Describe in writing and/or drawings how cells differ in terms of size, shape, and function.		
*A.2/2.12d	Cite differences between plant and animal cells in terms of structures and function.		
*A.3/2.12e	From a given list of organisms, correctly chart these as multicellular or unicellular.		
*B.3/2.12f	Demonstrate an understanding of cell grouping by identifying the relationship of cells, tissues, organs, and systems.		
*B.3/2.12g	Recognize that when a cell reaches its maximum size (and nuclear arrangement) the cell is ready to divide.		
*B.3/2.12h	Place in the proper order the events taking place in cell division when given the use of drawings or lists of changes illustrating this process.		
*B.3/2.12i	Write a paragraph on the differences in the results of cell division in unicellular and multicellular organisms that includes at least two examples of each type of organism (uni and multi) and how each example supports the resulting differences.		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*

2.12 The Cell

A.5/2.12a 1. State the 2 parts of the Cell Theory and give the meaning and importance of each.

Subordinate Test Item:
1. State a brief definition of a cell.

A.2/2.12b 1. Label the parts of the cells below

Diagram A
(1)_____
(2)_____
(3)_____
(4)_____
(5)_____

Diagram B
(1)_____
(2)_____
(3)_____
(4)_____
(5)_____
(6)_____
(7)_____

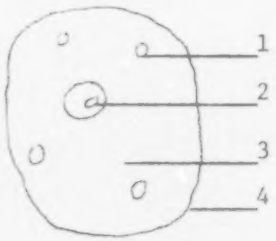


Diagram A
(5) name of cell

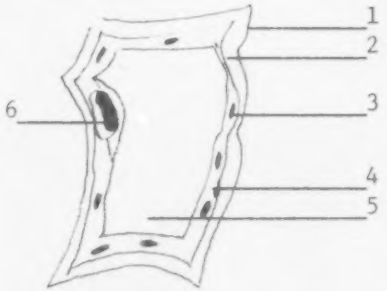


Diagram B
(7) name of cell

Subordinate Test Item
1. State the function of each of the following:
(a) cell wall _____
(b) nucleus _____
(c) cell membrane _____
(d) vacuole _____
(e) cytoplasm _____
(f) chloroplast _____

2.00 UNIT: DYNAMICS OF LIVING THINGS

2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*

2.12 The Cell

A.3/2.12e 1. From the following list of living things chart them as unicellular or multicellular.
amoeba, frog, fern, protozoa, moss, euglena, snakes, snail, diatom, starfish, grasshopper, bacteria.

Subordinate Test Item

1. What is the difference between multicellular and unicellular plants and animals?

B.3/2.12f Arrange these terms in the right order so that they will be listed from the simplest to the most complicated cell group: Organ system, tissue, cell, organ, organism.

B.3/2.12g 1. True or False: When a cell reaches its maximum size the cell is ready to divide.

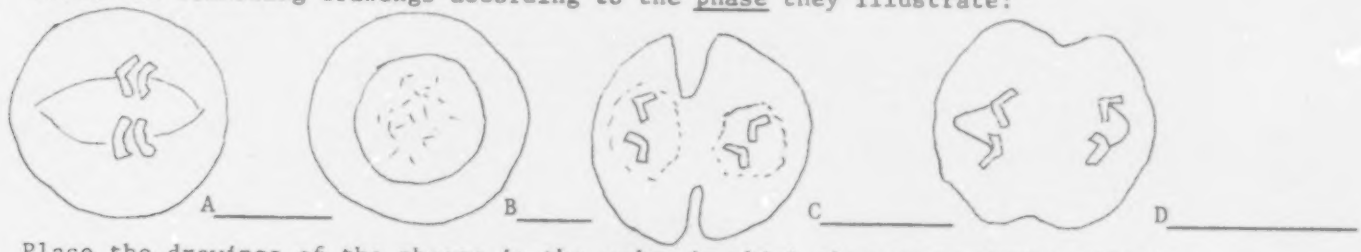
Subordinate Test Item

1. Describe in your own words what is meant by the terms "cell division".

B.3/2.12h 1. Write the number 1 in front of the first step in cell division, 2 for the next step and so on.

_____ Chromosomes line up in the middle
_____ The cell pinches off and divides
_____ The nuclear membrane disappears
_____ Chromatin material thickens and doubles into chromosomes
_____ Chromosomes separate and go to the ends of the cell
_____ The parts of the nucleus disappear into the cell

2. Label the following drawings according to the phase they illustrate:



Place the drawings of the phases in the order in which they occur during mitosis.

_____(1) _____(2) _____(3) _____(4)

LIFE SCIENCE

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.10 Topic: From Basic Materials to A Living Organism

Subtopic/Specifications/Content Number	*Test Item*
2.12 The Cell	
B.3/2.12i	1. Write a paragraph on the differences in the results of cell division in unicellular and multicellular organisms. Your answer must include at least 2 examples of each type of organism (unicellular and multicellular) and how each of these examples show differences between the 2 kinds.

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

*Objectives (*Minimum Objectives)*		*Activities*	*References*
2.21	The Function of Energy in Chemical and Physical Reactions		
	The student will:		
*A.2/2.21a	Demonstrate the understandings, (1) the definition of energy as the ability to do work; (2) energy is necessary for the movement of matter, by listing two examples of movement and work resulting from energy.		
*B.3/2.21b	Demonstrate understanding of the statement: "Energy is necessary for all life functions" by citing how energy is required for the life functions of plants and animals.		
A.2/2.21c	Show that energy is involved in (1) the combination of elements into compounds and (2) the separation of compounds into elements by citing at least 2 examples for each process.		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number — *Test Item*

2.21 The Function of Energy in Chemical and Physical Reactions

A.2/2.21a 1. Given-energy is the ability to do work. Based on this definition of energy, compare the following chart with work resulting from given forms of energy.

ENERGY	WORK RESULTING
1. heat energy	
2. light energy	

Subordinate Test Item
Question Samples
1. (a) What is energy?
(b) Name two different forms of energy.
(c) Why can energy never be lost? Or created?
(d) How are energy and life related?

2. Sample Multiple Choice Items
_____ 1. Energy is necessary for organism (a) to maintain life functions, (b) to aid digestion, (c) to aid in food getting, (d) so the organism can move.
_____ 2. Most organisms use for a source of energy (a) food, (b) oxygen, (c) sun, (d) green plant.
_____ 3. Energy is (a) the ability to do work, (b) necessary for the movement of matter, (c) involved in combination of elements into compounds, (d) all of the above.

B.3/2.21b No test item submitted.

A.2/2.21c No test item submitted.

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

*Objectives (*Minimum Objectives)*	*Activities*	*References*
2.22 The Energy Flow in Living Things		
The student will:		
*A.2/2.22a Identify the materials necessary for, products of, and reactions involved in the light and dark stages of photosynthesis.		
*B.1/2.22b Cite at least three examples of organisms including a plant, an animal, and man and tell how each depends upon the sun's energy.		
A.2/2.22c Identify what plant parts store the food made by green plants and in what forms these foods are found.		
*A.3/2.22d From a list provided, correctly match the substances as either needed for respiration or formed as a result of respiration.		
*A.2/2.22e Compare and contrast photosynthesis and respiration in terms of purposes of each, materials needed, products formed, reactions involved and any other teacher-stressed differences.		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number	*Test Item*

2.22 The Energy Flow in Living Things

A.2/2.22a 1. From the given list of materials, categorize them under the heading of (A) Materials for photosynthesis, or (B) Products of photosynthesis.

H_2O	Chlorophyll
CO_2	O_2
Light Energy	Glucose ($C_6H_{12}O_6$)

Needed Materials — Products of:

Arrange these materials and products into the equation for photosynthesis.

Subordinate Test Item

1. Using the following terms correctly, write a word equation for the process known as photosynthesis.

oxygen	starch
Carbon dioxide	water
glucose	sunlight
chlorophyll	

2. All of the following steps in the food-making process of green plants, but they are out of order. Three make up the light reaction, two make the dark reaction. Identify the matching steps by the following code in each blank: (A) light reaction, (B) dark reaction.

_____ 1. Glucose is polymerized into starch
_____ 2. Chloroplasts make the chimical chlorophyll
_____ 3. H_2 is released along with O_2
_____ 4. $2H_2 + CO_2 \rightarrow CH_2O + H_2O$
_____ 5. Sun's energy is captured by chlorophyll
_____ 6. $(CH_2O)_6 \rightarrow C_6H_{12}O_6$ (glucose)
_____ 7. The chemical energy in chlorophyll is used to split H_2O molecules.
_____ 8. Proteins, fats, and vitamins are synthesized.

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number	*Test Item*

2.22 The Energy Flow in Living Things

3. Sample Multiple Choice

A. The materials necessary for photosynthesis include
(a) sunlight; chlorophyll
(b) carbon dioxide; water
(c) sunlight; chlorophyll; carbon dioxide; hydrogen
(d) both a and b
(e) none of the above

B. The products of photosynthesis include
(a) oxygen; water
(b) a simple sugar
(c) carbon dioxide
(d) both a and b
(e) none of the above

C. The process of photosynthesis is composed of a light phase and a dark phase. Which of the following is TRUE of these phases?
(a) light phase does not require light energy
(b) dark phase requires light energy
(c) light phase requires light energy
(d) both a and b
(e) none of the above

D. In the light phase of photosynthesis
(a) light energy is changed to chemical energy
(b) chemical energy is used to split the water molecule
(c) Hydrogen is set free, but the Oxygen is retained
(d) both a and b
(e) all of the above

E. In the dark phase of photosynthesis
(a) Carbon dioxide and Hydrogen combine
(b) a simple sugar is produced
(c) chemical energy splits the water molecule
(d) both a and b
(e) both a and c

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number	*Test Item*

2.22 The Energy Flow in Living Things

B.1/2.22b 1. Make a diagram tracing the sources of energy for one plant, one animal, and man.

2. Energy Trace - For breakfast Jack ate some bacon, eggs, toast, butter, orange juice, and hot chocolate. Trace the source of energy for each food back to the sun.

3. Directions: Trace the energy source of the following living things back to the sun.

Example:

Rabbit	Sun	Coyote	Grass
Coyote ⟶	Rabbit ⟶	Grass ⟶	Sun

1.	Sun	Mouse	Corn	Cat
2.	Sun	Oak	Squirrel	Hawk
3.	Grass	Chipmunk	Oak tree	Sun
4	Sun	Owl	Grass	Mouse
5.	Eskimo	Reindeer moss	Sun	Reindeer
6.	Bass	Sun	Algae	Minnow
7.	Sun	Kangaroo rat	Coyote	Cactus
8.	Plankton	Copepod	Sun	Whalebone whale

4. Starting with the sun, show by means of arrows how the sun's energy gets into the boys body in the diagram below. (Assume that the boy eats the egg for breakfast.)

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number *Test Item*

2.22 The Energy Flow in Living Things

A.2/2.22c 1. Behind the plant parts tell two plants which store their food in this part and what form of food is stored.

	Plant Example	Food Form	Plant Example	Food Form
Root				
Seed				
Leaves				

A.3/2.22d 1. A. Needed for Respiration B. Results of Respiration
Decide if the substances below are needed for respiration or are results of respiration. Indicate your decision by placing the letter representation of your choice on the blank in front of each substance.

_____ 1. Water (H_2O)
_____ 2. Glucose ($C_6H_{12}O_6$)
_____ 3. Carbon Dioxide (CD_2)
_____ 4. Oxygen (O_2)
_____ 5. Energy

A.2/2.22e 1. Below is a list of sentences about the use of energy in living things. If the sentence is about Photosynthesis write the letter P on the line in front of the number. If the sentence is about Respiration place the letter R on the line.

_____ 1. It takes place in the cytoplasm of all living cells.
_____ 2. Oxygen gas is given off as a waste material.
_____ 3. It changes light energy to stored chimical energy.
_____ 4. The speed of this process is regulated by proteins called enzymes.
_____ 5. It can happen only in the presence of light.
_____ 6. It goes on twenty-four hours a day.
_____ 7. The materials it needs are food (Glucose), water, and oxygen.
_____ 8. It is the process of breaking molecules to release energy.
_____ 9. The materials needed are water, carbon dioxide, and chlorophyll.
_____ 10. It is the process of making food by green plants.
_____ 11. Water and carbon dioxide are left over at the end of this process.
_____ 12. It usually takes place in the leaves of plants.

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number — *Test Item*

2.22 The Energy Flow in Living Things

2. Complete the chart below:

	Purpose	Materials Needed	Products	Chemical Equation
Respiration				
Photosynthesis				

3. Compare photosynthesis with respiration by completing the following chart:

	Photosynthesis	Respiration
1. purpose		
2. materials needed		
3. products made		
4. change in energy		
5. where in organism reaction occurs		
6. which organism carry on reaction		

Subordinate Test Item
1. Complete the following reactions:

A. energy + _____ + H_2O $\xrightarrow[\text{chlorophyll}]{\text{sunlight}}$ $C_6H_{12}O_6 + O_2$

B. $C_6H_{12}O_6$ + _____ $\longrightarrow$ $CO_2 + H_2O$ + energy

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

*Objectives (*Minimum Objectives)*	*Activities*	*References*
2.23 The Energy Flow Through the Community The student will:		
E.1/2.23a Construct and maintain for at least a week a well-balanced aquarium or terrarium.		
*A.3/2.23b Given at least five communities, classify the producers, consumers, and decomposers in each.		
*B.1/2.23c Construct a food chain involving organisms for each of at least three communities.		
*B.3/2.23d Demonstrate an understanding of food pyramids by drawing a food pyramid and explaining in a paragraph the amount of energy available at each level and why it is advantageous to obtain food supplied from the beginning of the food chain.		
*B.3/2.23e Given a diagram of a portion of the viosphere, trace the cycle of each of the raw materials (water, nitrogen, carbon dioxide, and oxygen) needed by living things through the environment.		
*A.3/2.23f Identify from a list those organisms that would be classified as decomposers.		
*D.3/2.23g Write a paragraph evaluating the importance of decomposers to the community giving at least two reasons to support the hypothesis made.		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number — *Test Item*

2.23 The Energy Flow Through the Community

E.1/2.23a No test item submitted - Only 1 subordinate

Subordinate Test Item

1. Question: Which of the following items is needed to make an aquarium balanced if it now contains fish, snails, gravel, and water. (a) marbles, (b) minnow, (c) algae, (d) none of the above.

A.3/2.23b 1. Tell who are some of the producers, consumers, and decomposers in the following communities by Filling in the chart below. Give 2 examples for each type of organism.

	Producer	Consumer	Decomposer
A. Forest			
B. Pond			
C. Meadow			
D. Ocean			
E. Grassland			

2. Place the following under the proper heading on a chart: pond, scum, ducks, beaver, swamp potato, martin, otter, water net, fish diatoms, carp, snakes, desmids, catfish, water fleas, fairy shrimp, mink herons, turtles, muskrat, water snails, toads, insects, cyclops, salamanders, bacteria.

Producer	Consumer	Decomposer
Pond Scum Swamp potato water net, diatoms, Desmids	Ducks, beaver water fleas, fairy shrimp, Martin, otter, fish, mink, herons, turtles, muskrat, toads, insects, cyclops, salamander	Bacteria

This sample test item may be used for other communities.

Subordinate Test Item

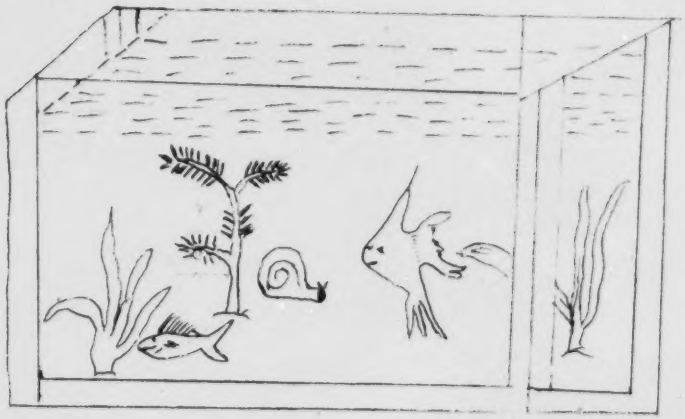
1. Define producer, consumer, decomposer.

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number	*Test Item*
2.23 The Energy Flow Through the Community	

2. Sample Multiple Choice Item
In a pond community, there is green algae near the surface and a small plant-eating fairy shrimp. These are food for small fish. At the bottom are catfish which feed on dead-decaying plant and animal material. Which of these organisms is the producer of the pond and is the first link in its food chain?
(a) small fish, (b) algae, (c) catfish, (d) snail

3. In a balanced aquarium, as shown, answer questions 1 through 4.
   1. Which organism is (a) the food producer?_____ (b) the food consumers?_____, _____, _____.
   2. For what two materials do the food consumers depend on the producers? (a)_____, (b)_____.
   3. For what two materials do the food producers depend on the consumers? (a)_____, (b)_____.
   4. What principle in science is illustrated in a balanced aquarium? _____ _____.



2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number	*Test Item*
2.23 The Energy Flow Through the Community	

4. Completion: Supply the missing word or words to complete the statements below.
A series of organisms, starting with a green plant, in which each organism serves as a source of energy for the next one in the series is called a _____ _____.

When producers and consumers die, such organisms as bacteria feed upon their bodies and decay them. These organisms are called _____.

Food chains often meet and cross one another. The criss-crossing of many food chains is called a _____.

In a food chain, the organism able to make its food from inorganic substances, and upon whom the other plants and animals in the chain depend are called _____.

In a food chain, a plant or animal that cannot derive its energy from inorganic matter, but must depend upon other plants or animals for its energy for living are called _____.

B.1/2.23c 1. Work out the following food chains:

1.	worm	snake	bird	green plant	fox	spider	man
2.	wolf	grass	wildcat	man	bear	rabbit	
3.	minnow	algae	sunfish	copepod	man	bass	
4.	algae	minnow	frog	snake	man	owl	
5.	worm	garter snake	green plant	man	heron	fox	spider
6.	microscopic plants		mollusks (clams, snails)		fisherman		fish
7.	centipede	man	fish	green plant	bear		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.20 Topic: Energy in Living Things

Subtopic/Specifications/Content Number	*Test Item*

2.23 The Energy Flow Through the Community

B.3/2.23d 1. A. Construct a food pyramid using one of the food chains that you have studied.
B. Explain the amount of energy available at each level of a food pyramid.
C. Why is it advantageous to get food near the beginning of a food pyramid, (or a food chain)?

Subordinate Test Item

1. In a farm community, mice feed on corn and cats capture and eat the mice. When placing the organisms on their correct energy levels in the following food pyramid, cats should be placed on energy level ...

(a) 1. ___ ←level 3
(b) 2. _____ ←level 2
(c) 3. _____ ←level 1

2. Given a drawing of a food pyramid by the teacher.
Directions: Study the food pyramid shown to answer questions 1 to 3 below.
1. Why is the base of the pyramid made up of green plants?
2. On what do the animals in the middle of the pyramid feed?
3. What kinds of animals are usually found at the top of the pyramid?

B.3/2.23e 1. The teacher will supply diagrams illustrating each of the following cycles of raw materials: water, nitrogen, carbon dioxide, and oxygen.
Question: Trace the cycle of each raw material through its respective diagram.

A.3/2.23f 1. Put a check (✓) in front of the following organisms that are decomposers:

_____ bacteria
_____ mushroom
_____ earthworm
_____ yeast
_____ mold
_____ vulture

D.3/2.23g 1. Answer the following question in a short paragraph:
Why are decomposers important to the community? Give at least 2 reasons that support the answer you have just given.

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.30 Topic: Maintaining Life

*Objectives (*Minimum Objectives)*	*Activities*	*References*
2.31 Vital Functions of the Organisms The student will:		
*D.3/2.31a Interpret the statement, "To stay alive a cell must take in essential materials," by predicting the effect of lack of water or food, salinity changes, or other chemicals on the survival of a cell.		
*A.2/2.31b Demonstrate an understanding of the statement, "To stay alive a cell must have a source of energy and get rid of waste products," by charting the energy source and means of waste removal for five organisms (unicellular and multicellular plants and animals).		
B.3/2.31c State in writing, drawings, charts, etc. the relationship between food availability and numbers and kinds of unicellular pond life.		
*A.2/2.31d List at least four needs of any unicellular or multicellular organism.		
*D.3/2.31e Compare and contrast cell specialization in one unicellular and one multicellular organism in terms of amount of and reason for specialization.		
A.3/2.31f Show an understanding of the grouping of plants and animals according to methods for satisfying vital needs by grouping given plant and animal samples based on a teacher prescribed system (size, body structures, etc.)		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.30 Topic: Maintaining Life

Subtopic/Specifications/Content Number	*Test Item*

2.31 Vital Functions of the Organisms

D.3/2.31a 1. Predict the effect that the following would have on a cell:
(a) lack of food
(b) lack of water
(c) exposure to harmful chemicals

A.2/2.31b 1. Complete the following chart:

Organism	Energy Source	Waste Product(s) and Means of Waste Removal
Paramecium		
Euglena		
Amoeba		
Frog		
Human		

B.3/2.31c No test item submitted.

A.2/2.31d 1. List at least 4 needs that any organism must meet if it is to survive.

D.3/2.31e No test item submitted.

A.3/2.31f 1. Match the adaptation (body structure) in column B with the organism in column A. Write the alphabet on the blank line.

_____ 1. Oak and Maple tree	a. gills
_____ 2. Whale	b. lungs
_____ 3. Ivy vine	c. thick stems
_____ 4. water lilies	d. well developed root system
_____ 5. Catfish and Lobster	e. thick layer of fat
_____ 6. Cactus	f. air tubes
_____ 7. Lichen	g. excessive roots
_____ 8. Birds and Reptiles	h. air chambers
_____ 9. Insects	i. low, flat, and leathery
_____10. Monkeys	j. fingers and toes and sometimes a tail

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.30 Topic: Maintaining Life

*Objectives (*Minimum Objectives)*	*Activities*	*References*
2.32 The Continuity of Life		
The student will:		
*A.2/2.32a Explain with at least 3 examples what will happen if the needs of an organism cannot be satisfied.		
*A.2/2.23b Cite one method a given plant or animal has for reproducing new cells to replace dead ones. (propagation, regeneration, healing, etc.)		
*A.2/2.32c When questioned about causes of "natural" death, state that the natural life span of an organism depends on the ability of its cells to replace themselves.		
*B.1/2.32d Demonstrate a knowledge of the fact that members of a population must reproduce to replace organisms as they die or face extinction by writing a paragraph on an animal that faces extinction being sure to include causes for the problem.		

2.00 UNIT: DYNAMICS OF LIVING THINGS
2.30 Topic: Maintaining Life

Subtopic/Specifications/Content Number	*Test Item*
2.32 The Continuity of Life	
A.2/2.32a	1. Name at least 5 needs of an amoeba. What will happen if these needs are not met?
	2. In a multicellular organism(s) many cells are removed from their proper environment. If this is true, then how do multicellular organisms meet their needs?
	Subordinate Test Item 1. If a single-celled organism is in its proper environment it can meet its needs. What will happen to the organisms in the following cases: A. A Paramecium is unable to get food, due to water pollution. B. A cheek cell does not receive a supply of O_2. C. A green plant cell cannot get CO_2 to carry on photosynthesis.
A.2/2.32b	No test item submitted.
A.2/2.32c	1. What ability determines the natural life span of an organism?
B.1/2.32d	No test item submitted.

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.10 Topic: Individual Interrelationships

*Objectives (*Minimum Objectives)*		*Activities*	*References*
	The student will:		
*A.2/3.10a	Show an understanding of the statement, "All organisms are interdependent," by citing at least three examples that illustrate this point.		
*A.3/3.10b	Compare and contrast mutualism parasitism, and commensalism by charting each of the three in terms of specific partners involved, reasons for partnership, and whether each partner is harmed, benefitted, or not affected.		
*A.3/3.10c	Given a teacher-prepared list of organisms, group organisms into one of the following categories based on their feeding habits: (a) herbivores, (b) carnivores, (c) omnivores, (d) scavengers, and (e) saprophytes.		
*D.3/3.10d	Conclude in writing or orally what a community would be like if there were no scavengers or saprophytes being sure to include that the role of these organisms is to keep a community free of dead organisms and waste materials.		

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.10 Topic: Individual Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

A.2/3.10a 1. "All organisms are interdependent." Give 3 examples that illustrate this statement.

2. "All organisms are interdependent." Circle the statements below that are examples of this:
   A. A cow eats grass.
   B. Mistletoe lives in a tree.
   C. The snake suns himself.
   D. The fish swims in the river.

3. Describe a plant and animal community in your neighborhood. Indicate the relationships between specific organisms which live in your community.

Subordinate Test Item
1. Define interdependence.

A.3/3.10b Complete the chart:

Partnerships in Nature	Partners Involved	Reasons for Partnership	Identify each partner as harmed, benefitted, or not affected.
Mutualism	A._____ B.		A._____ B.
Parasitism	A._____ B.		A._____ B.
Commensalism	A._____ B.		A._____ B.

Subordinate Test Items
1. Define and give two examples of each of the following: mutualism, commensalism, and parasitism.

2. Sample Multiple Choice Item
   Which of the following is not an example of mutualism.
   A. lichen
   B. sea anemone and a horse shoe crab
   C. dog and tick

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.10 Topic: Individual Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

3. Sample Fill in the Blank Items
   A. A relationship in which one organism is benefitted and the other is not affected is known as _____.

   B. A relationship in which one organism lives on or in another and obtains its nourishment at the expense of the host organism is _____.

   C. A relationship in which both organisms are benefitted is known as _____.

A.3/3.10c 1. Group the following organisms into the categories below:
cow, horse, pig, tiger, bear, goat, dog, cat, man, mushrooms, snakes, buzzards

HERBIVORES	CARNIVORES	OMNIVORES	SCAVENGER	SAPROPHYTES
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

2. Match each of the organisms listed in the left column with the term or terms on the right which describe its food-getting habits:

_____	1. fox	A.	herbivore
_____	2. mountain lion	B.	carnivore
_____	3. toadstool	C.	omnivore
_____	4. cow	D.	scavenger
_____	5. vulture	E.	saprophyte
_____	6. man		
_____	7. hawk		
_____	8. land snail		
_____	9. caterpillar		
_____	10. mouse		

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.10 Topic: Individual Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

3. Match the following list with herbivore, carnivore, omnivore, scavenger, saprophyte:
   A. duck_____
   B. grasshopper_____
   C. Adult frog_____
   D. tadpole_____
   E. fungus_____
   F. mold_____
   G. buzzard_____
   H. bobcat_____
   I. giraffe_____
   J. crayfish_____

4. The teacher will draw a disgram of a scene in nature that includes animals and plants that have been numbered.
   Directions: Look at the diagram given. Group the organisms based on their feeding habits into the following categories:

HERBIVORES	CARNIVORES	OMNIVORES	SCAVENGERS	SAPROPHYTES

Subordinate Test Items
1. Define herbivores, carnivores and omnivores.

2. Classify each of the following as Saprophytes or Scavengers:
   mushroom, mold, eagle, yeast, smut, buzzard, hyena

D.3/3.10d 1. Write a paragraph comparing and contrasting scavengers and saprophytes and describing what the community would be like without them:
   A. How are they similar?
   B. How are they different?
   C. What is their purpose?
   D. What would the community be like without them?

Subordinate Test Item:
1. Define: scavenger and saprophyte.

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.20 Topic: Social Interrelationships

Objectives (*Minimum Objectives*)	*Activities*	*References*
The student will:		
A.2/3.20a Cite four examples of territorial behavior and list at least three benefits derived from establishment of territories.		
*A.2/3.20b List at least one example of each of the following: flock, herd, pack, and school and cite at least three advantages of being gregarious.		
B.3/3.20c Demonstrate an understanding of the statement, "Individuals in some populations are social-forming, highly organized colonies," by comparing the organizational patterns of a common social animal and a non-social animal.		
*A.3/3.20d From a given list of organisms, group each as being either gregarious or social and give at least two reasons for the selections made.		

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.20 Topic: Social Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

A.2/3.20a 1. (a) State at least 4 examples of territorial behavior.
(b) Give at least 3 benefits obtained by establishing territories.

Subordinate Test Items

1. Sample Questions
   (a) What is a territory?
   (b) What is meant by the terms "territorial behavior?"
   (c) How does territorial behavior help a group of animals to get along?

2. Sample Multiple Choice Items
   (a) Which of the following is not an example of territorial behavior:
      1. male birds seeking a place in which he and a female cow build a nest and produce young.
      2. schools of fish
      3. honeybees seeking trees to build their hives
      4. frogs on a stone in a lake

   (b) Which of the following is NOT an advantage of territoriality?
      1. it cuts out some of the waste of fighting
      2. it satisfies basic male urges
      3. it limits populations to the number that can be supported by the environment
      4. it is an efficient way of getting work done in a group

   (c) A bird will claim a certain area in the forest. He will warn other birds to keep out. Which of the following are benefits of wetting up this territory. (1) feeding, (2) nesting, (3) homesite, (4) all of the above.

A.2/3.20b 1. Group the following organisms into one of the following categories listed below based on their living habits: geese, fish, deer, ducks, fur seals, birds, baboons, dolphins, wolves, dogs, sheep, goats, horses, musk ox, porpoise, cows, American bison, African buffalo, crows, elephants, wild cattle.

FLOCK	HERD	PACK	SCHOOL

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.20 Topic: Social Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

Part II. The word gregarious means associating or going together in herds, flocks, or other groups. When organisms behave in this manner we say they are fond of company. List at least 3 advantages of being gregarious.

Subordinate Test Items:

1. Define gregarious.

2. Sample Multiple Choice Item
Traveling in flocks, herds, packs and schools are examples of gregarious behavior. Which of the following is an example of the advantages of being gregarious.
(a) safety, (b) being alone, (c) both a and b, (d) none of the above.

B.3/3.20c 1. Compare man with a social animal (bee) and a non-social animal (fish) by completing the chart below:

	Man	Bee	Fish
A. Is there dividion of labor in the group, or do individuals work mainly for themselves?			
B. Are individuals physically fitted for their work?			
C. Is each individual trained for his work or is he born knowing his work?			
D. Can non-workers survive?			
E. Form ot communication in the group (scent, sound, body language, other)			
F. Do individuals show territorial behavior against each other?			
G. Do individuals show territorial behavior against other groups?			
H. Type of social interrelationship (territorial, gregarious, or social)			

Subordinate Test Item

1. Explain the social patterns of ants, bees, or termites and what has been gained by them for forming societies.

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.20 Topic: Social Interrelationships

Subtopic/Specifications/Content Number		*Test Item*
A.3/3.20d	1.	Group the following animals as being either gregarious or social: deer, birds, honeybees, wolves, buffalo, sheep, ants, minnows, termites, prairie dogs. Give at least 2 reasons for the selections you have made.

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS

3.30 Topic: Population and Community Interrelationships

*Objectives (*Minimum Objectives)*		*Activities*	*References*
	The student will:		
A.2/3.30a	Recall at least four different ways in which organisms compete with one another in their environments.		
B.3/3.30b	Demonstrate an understanding of what is meant by population density by stating how population density is controlled by competition, disease, and predation being sure to include a specific illustration of each control.		
B.3/3.30c	Rank four different species (including excessive and non-excessive reproducers) in order from least to greatest in productivity.		
A.2/3.30d	Identify as a reason for high productivity of certain organisms the maintenance of adequate numbers of the species.		
*B.3/3.30e	Show an understanding of the term adaptation and how adaptations determine the success of a species by telling how a particular adaptation enables an organism to survive.		
D.3/3.30f	Given an example of a stable community, predict five conditions which would be produced by such things as a fire, widespread disease among predatory species, drought, etc.		
*B.3/3.30g	Show an understanding of the statement, "The less fit individuals are the first to be eliminated," by reporting on how the inability to adapt to changes in the environment led to the extinction of a given organism (selected from a list of extinct organisms) being sure to include the specific environmental changes that caused the extinction.		

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.30 Topic: Population and Community Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

A.2/3.30a 1. List at least four different ways in which organisms compete with one another.

2. Multiple Choice:
Of the following activities of living organisms, which one is not a way in which organisms compete with one another in their environment?
(a) getting food
(b) finding a place to live
(c) dying
(d) getting oxygen
(e) receiving sunlight

3. List 4 different ways in which the following organisms compete with one another in their environments.

	Growing Plants	Mold	Yeast
1.			
2.			
3.			
4.			

Subordinate Test Items

1. Sample Multiple Choice Item

(a) In an experiment scientist Smith put ten green plants in one container A and twenty-five in another B. In which container is there the greatest amount of competition, (a) or (b)?

Which of the following things are the plants competing for
(a) O_2, (b) CO_2, water, food, (c) CO_2, (d) CO_2 and sunlight, (d) none of the above.

(b) Organisms compete with one another in their environment in many different ways. Which of the following statements is true?
A. Organisms compete for food.
B. Organisms compete for space.
C. Organisms compete for shelter.
D. All of the above.
E. None of the above.

(c) Limited supplies of food, water, and space make it necessary for animals to (a) fight with each other, (b) compete with each other, (c) battle with each other, (d) all of these.

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.30 Topic: Population and Community Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

B.3/3.30b 1. How is the population density of animals controlled by competition, disease, and predation. Give an example for each control.

Subordinate Test Items
1. Question Samples
   (a) What is meant by the term "population density?"
   (b) What are some environmental factors that help determine population size?
   (c) Describe some of the species factors that affect the size of a population.
   (d) How does man affect the size of a population?

2. Sample Multiple Choice Item
   In the year 1970, the number of rabbits in a community of foxes and various other plants and animals decreased by 100. Which of the following is a possible control of the rabbit population density. (a) competition, (b) disease, (c) predation, (d) all of the above, (e) none of the above.

B.3/3.30c 1. Rank the following in order from least to highest in productivity: perch, horse, robin, and fruit fly.

A.2/3.30d No test item submitted.

B.3/3.30e 1. Tell how each of the following adaptations helps an organism survive:
   (a) a desert plant such as a barrel cactus has a shallow, widespread root system.
   (b) s starfish has "tube feet"

2. Given a drawing of different bird beaks, tell how each bird beak helps the animal to survive.

Subordinate Test Items
1. Question Samples
   (a) Explain what is meant by the term protective coloration.
   (b) Give three examples of protective coloration.
   (c) How is protective coloration beneficial to an organism?
   (d) What is meant by "mimicry?"
   (e) Give at least two examples of mimicry.

3.00 UNIT: INTERRELATIONSHIPS AMONG LIVING THINGS
3.30 Topic: Population and Community Interrelationships

Subtopic/Specifications/Content Number	*Test Item*

2. Place the animal in its proper category: woodpecker, turtle, tree frog, praying mantis, Caligo Butterfly, Chameleon, snake, anteater, bee, tiger, Robber Fly, Zebra, Procupine, Elephant, Wasp Moth, Giraffe, Walking Stick, Possum.

Mimicry	Camouflage	Protective Adaption	Food Adaption

3. Sample Multiple Choice Items
   1. Squids and octopi escape from their enemies by use of (a) luminous organs, (b) ink-screen, (c) electric charge, (d) none of these.

   2. An adaptation that enables an organism to blend in with its background is (a) protective coloration, (b) mimicry, (c) luminous organs, (d) none of these.

   3. Organisms which live in a mountain stream must adapt by means of (a) sucking mouths, (b) rooting themselves to the stream bottom, (c) becoming streamlined and flattened, (d) any of these.

   4. A flesh-eating bird would have a beak that was (a) spear-shaped, (b) short, (c) curved, (d) chisel-shaped.

   5. An example of organisms which adapt by mimicry is (a) robber fly, (b) viceroy butterfly, (c) walking-stick caterpillar, (d) all of these.

D.3/3.30f No test item submitted.

B.3/3.30g 1. The teacher will provide a list of animals that are extinct. The following instructions will be given the student: Select from the list one extinct animal. Write a short report on what specific environmental changes caused the extinction of the animal you selected.

Subordinate Test Items.

1. Give an example that illustrates this statement, "The less fit individuals are the first to be eliminated."

2. From the following statement tell which one is true and why? Organisms are facing extinction because of changes taking place in the environment: (a) those most fit are to be the ones most likely eliminated, (b) those less fit will survive, (c) the less fit individuals are the first to be eliminated.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.10 Topic: Communities

*Objectives (*Minimum Objectives)*	*Activities*	*References*
The student will:		
B.1/4.10a Show an understanding of the terms species and population by constructing a bar graph which indicates the variety of the same species in a given population.		
B.3/4.10b Demonstrate an understanding that each community may be characterized by the types and numbers of living things within it by citing at least three examples of a group of interdependent populations in a particular area making up a community.		
B.1/4.10c Given a variety of communities from which to choose, describe the physical features of the habitat of three specified organisms that live in the chosen community.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.10 Topic: Communities

Subtopic/Specifications/Content Number	*Test Item*

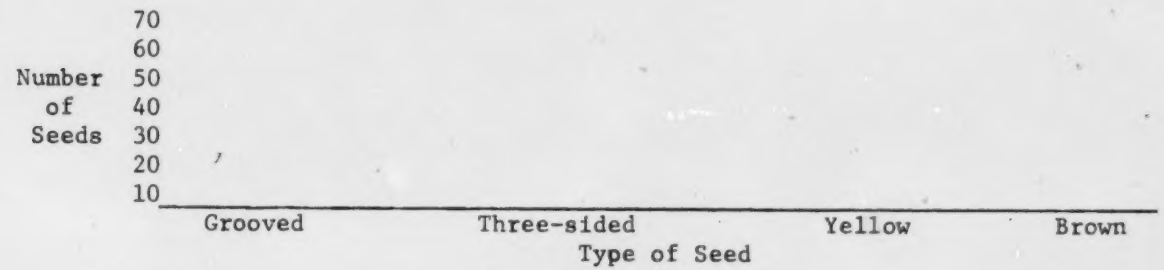
B.1/4.10a 1. Communities

Species - A group of plants or animals that can breed only with one another.

Population - A group of two or more organisms of the same species.

Assignment: Using the following data, construct a bar graph below, in the space provided, and answer the questions below.

Data: Harry and Sarah have a bag of birdseed. In it, there are grooved seeds, three-sided seeds, yellow seeds, and brown seeds. All of these seeds can be bred with one another. Harry and Sarah separate these seeds into 4 different piles and find that there are 30 grooved seeds, 20 three-sided seeds, 50 yellow seeds, and 70 brown seeds. Using these figures draw a bar graph.



Questions:

1. How many species of bird seed do we have in the population?

2. Is there a variety of one species of bird seed in this population? Explain.

2. Item: Construct a bar graph showing the variety of the same species in a given population. Use the following information to graph:

Cardinals - 10
Robins - 5
Blue Jays - 2

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.10 Topic: Communities

Subtopic/Specifications/Content Number	*Test Item*
	Subordinate Test Item 1. What is the difference between a species and a population?
B.3/4.10b	1. Cite at least 3 examples of a group of interdependent populations in a particular area making up a community.
	2. Of the following 5 examples, three are examples of interdependent populations. Which of the following are the three examples of interdependent populations? A. bumblebee; clover; deer; mouse; fox B. trout; horse; duck; minnow; algae C. mayfly; trout; duck; minnow; algae D. eagle; rabbit; green plants; insects
B.1/4.10c	1. From our study of a pond community describe the physical habitat of the following organism: A. Spirogyra B. cattails C. tadpoles D. dragonfly

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Objectives (*Minimum Objectives)	*Activities*	*References*
4.21 Standing Water The Student will:		
*A.2/4.21a Cite lakes and ponds as examples of standing bodies of fresh water.		
*B.1/4.21b Explain how lakes and ponds differ in terms of their physical habitats and life forms.		
B.1/4.21c Make an aquarium which attempts to show balance in a pond or lake.		
E.2/4.21d Make an aquarium which attempts to show balance in a pond or lake.		
*A.2/4.21e List at least four factors or conditions which would affect the population density of pond or lake organisms and their distribution within the various pond or lake regions.		
*B.1/4.21f Explain with drawings and/or written descriptions the structures or body parts that are used in adaptation for each of at least two plants and three animals that live in a pond (lake).		
*A.3/4.21g Chart pond (lake) organisms as being located in either the shoreline, surface, or sub-surface.		
*D.3/4.21h Conclude that life is more abundant and diverse near the shoreline and give at least four reasons why this is true.		
*A.3/4.21i Given a list of pond plants and animals, correctly identify the organisms as transient; those that do not naturally occur there; and those that are permanent residents.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Objectives (*Minimum Objectives)	*Activities*	*References*
4.21 Standing Water The student will:		
*B.1/4.21j Construct at least two food chains or food webs that exist in a pond or lake being sure to label each organism included as either a producer, consumer, or decomposer.		
D.3/4.21k Conclude that puddles are temporary still-water communities affecting populations around them and give at least two reasons that support this conclusion.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number — *Test Item*

4.21 Standing Water

A.2/4.21a 1. State 2 examples of standing bodies of fresh water.

2. Examples of standing fresh water are
   A. lakes and ponds
   B. rivers and streams
   C. oceans and seas
   D. springs and geysers

B.1/4.21b 1. Using the following list give 4 differences and 2 likenesses of lakes and ponds:
Fresh water, temperature, depth, fish, shore plants and animals, water plants, sunlight, size.

2. List two differences and two similarities of ponds and lakes.

3. DIRECTIONS: Fill in the chart below using the information above

	Amount of Sunlight	Amount of Salt	Temperature	Depth	Microscopic Organisms	Water Plants	Shore Plants
POND							
LAKE							

B.1/4.21c No test item submitted.

E.2/4.21d No test item submitted.

A.2/4.21e 1. Which of the following factors would affect the population density of a pond:
   A. sewage
   B. industrial waste
   C. temperature
   D. amount of oxygen available
   D. all of these

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4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number	*Test Item*

4.21 Standing Water

2. Cite at least four factors that would determine the population density of a pond community.

Subordinate Test Item
1. Students will tell how these 4 factors affect population density of a pond: (a) oxygen, (b) sewage, (c) industrial wastes, (d) temperatures.

B.1/4.21f 1. List the adaptations of the following organisms to a pond or lake habitat: elodea, turtles, water beetles, fresh water snails, trout, water strider, and mosquito larvae.

A.3/4.21g 1. Fill in the following chart with the appropriate pond organism.

Organism that lives on the shoreline	Organism that lives on the surface	Organism that lives Under the surface

Teacher must provide list from which to make selections.

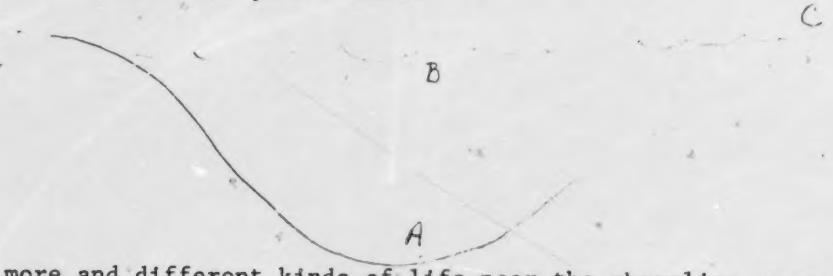
2. Place the following organisms where they "belong" in or on the pond: Spirogyra, cattails, Oscillatoria, snails, beaver, marten, otter, duck, frogs, tadpoles, dragonfly, rushes.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number	*Test Item*

4.21 Standing Water

D.3/4.21h 1. Below is a drawing of the side view of a lake. Where would you find the most different life forms? Give 4 reasons for your choice.



2. Are there more and different kinds of life near the shoreline or on the surface? Explain by giving 4 reasons for your selection.

A.3/4.21i 1. Below is a list of organisms. Some are permanent residents of a pond, others are transient, and others do not occur in a pond community. Indicate where each organism fits by matching column A and column B.

A	B
_____ 1. ducks	(a) permanent residents
_____ 2. tadpoles	(b) transient
_____ 3. frogs	(c) do not naturally occur there
_____ 4. bass	
_____ 5. geese	
_____ 6. whale	
_____ 7. dragonfly	
_____ 8. lion	

B.1/4.21j 1. Arrange the two groups of organisms listed below in the correct order as they exist in a pond food chain:

A. Protozoa, algae, crayfish, turtle, bacteria, tiny crustacean, minnow, large fish.
A.

B. Large fish, crayfish, algae, turtle, parasites, small fish, bullfrog.
B.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number	*Test Item*
4.21 Standing Water	
	Label each organism included above as either of the following: A. Producer: B. Consumer: C. Decomposer:
	2. Construct two food chains that would be found in a pond community. Tell whether each organism in the food chain is a producer, a consumer, or a decomposer.
D.3/4.21k	1. From our study of puddle organisms one would conclude that puddles are: A. lasting, still-water communities B. temporary, still-water communities Give 2 reasons to support your selection.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

*Objectives (*Minimum Objectives)*	*Activities*	*References*
4.22 Flowing Water		
The student will:		
*B.1/4.22a Group at least five organisms belonging to a flowing stream or river community as to their adaptation to fast flowing water in terms of shape, locomotion (lack of motion) and way of getting food.		
*B.1/4.22b Compare organisms in a swift mountain stream and a sluggish lowland one in terms of food habits, temperature, light and/or oxygen requirements.		
B.3/4.22c Distinguish between fresh water plants and animals that live in flowing water and those that live in standing water by giving at least three reasons why each organism could not live or would have difficulty living in the other water community.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number	*Test Item*
4.22 Flowing Water	

B.1/4.22a 1. In the right column, briefly explain how each of the following organisms is adapted for survival in fast-flowing water:

Organism	Adaptation
1. insect larvae	
2. caddisfly larvae	
3. snail	
4. fish and tadpole	
5. plant	
6. trout	
7. Cladophora alga	

2. Choose the organisms that would live in a fast flowing stream:
   A. cladophora
   B. trout
   C. amoeba
   D. Ulthorix
   E. Spirogyra
   F. planaria
   G. caddis fly larvae

   Now tell ways that the organisms you chose are adapted to life in fast flowing water.

Subordinate Test Item
   1. Which are examples of flowing fresh water?
      A. lakes and ponds
      B. rivers and streams
      C. oceans and seas
      D. springs and geysers

LIFE SCIENCE

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number	*Test Item*

4.22 Flowing Water

B.1/4.22b 1. Compare organisms found in a swift mountain stream with sluggish lowland in terms of:
- A. food habitats
- B. temperature
- C. light or oxygen
- D. body shape
- E. locomotion

B.3/4.22c 1. Below is a list of descriptions of different organisms. Read each description and decide if you think the organism best belongs in a flowing or fresh water community. Code the blank on your paper with F (flowing) or S (standing).

_____ 1. a plant which floats on the surface
_____ 2. a plant which has roots to anchor it
_____ 3. a plant that grows best in cool water
_____ 4. a plant that grows best in very warm water
_____ 5. an animal that likes to burrow in mud
_____ 6. an animal with suction feet
_____ 7. an animal which is adapted to living in oxygen-poor water by gulping air at the surface.
_____ 8. an animal which depends completely on oxygen dissolved in water
_____ 9. an animal with a streamlined body
_____ 10. an animal with strong swimming power
_____ 11. an animal that sits and waits for dead things to eat

Subordinate Test Item

1. Tell whether you would find the following in a stream or pond: (Give one reason for your decision)
   - A. water lily
   - B. trout
   - C. snail
   - D. sunfish
   - E. algae
   - F. caddis fly
   - G. minnow
   - H. tadpole

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4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.20 Topic: Fresh Water Communities

Subtopic/Specifications/Content Number	*Test Item*
4.22 Flowing Water	
	2. Compare a pond with a mountain stream according to (a) water temperature, (b) movement of the water, (c) its sources and (d) the amount of oxygen present.
	3. What would probably happen to an animal taken from a pond and put in a swiftly flowing mountain stream? Explain.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.30 Topic: Marine Communities

Objectives (*Minimum Objectives)	Activities	References
The student will:		
*B.1/4.30a Given a picture or drawing of the ocean and shore area, correctly mark the open ocean, estuarine, and intertidal areas.		
*A.2/4.30b Differentiate between the major marine zones, open ocean, estuarine, and intertidal, by stating at least three physical differences that exist between the zones.		
*D.3/4.30c Conclude that most marine organisms of economic importance are located near land and give at least three reasons that give support to this conclusion.		
A.2/4.30d Describe how the distribution of at least two marine plants and five marine animals is affected by variations of salinity, light, temperature, and pressure on each organism's life activities.		
*A.2/4.30e State how at least three bottom-dwelling marine organisms have adapted to their environment.		
*A.2/4.30f Cite at least three examples of organisms that have been able to adjust to differences in salt concentrations and are found in the transition zone between salt water and land.		
*A.2/4.30g From a given list of at least 5 marine animals, write a paragraph telling how at least 3 of them can withstand the changing conditions of tidal fluctuations being sure to include problems faced and adaptations to these.		
A.2/4.30h From a given list of organisms, choose at least 13 examples of marine organisms occupying different habitats during their life cycle and by means of a drawing or description in writing, explain the life history of at least one.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.30 Topic: Marine Communities

Objectives (**Minimum Objectives*)	*Activities*	*References*
The student will:		
*B.1/4.30i Make a food chain depicting the energy flow among life forms in a particular marine zone.		
*A.3/4.30j From a given list of at least 5 organisms, identify each as whether it lives mainly in fresh, brakish (estuarine), or salt water.		
*D.3/4.30k Explain in a paragraph why an organism (teacher specified) can live in one water community (fresh, brakish, or salt) and not very well or at all in another.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.30 Topic: Marine Communities

Subtopic/Specifications/Content Number	*Test Item*

B.1/4.30a 1. The teacher will provide a drawing of a cross-section of the ocean. Label the diagram with the following words: open ocean, estuarine, intertidal.

Subordinate Test Item
1. The Chesapeake Bay is called an: (a) ocean, (b) sandy beach, (c) estuary, (d) fresh river, (e) rocky shore.

A.2/4.30b 1. List at least three physical differences that correctly describe the open ocean, an estuary, and an intertidal area of a marine environment.

Subordinate Test Item
1. Question Samples
(a) Why are the oceans salty? (2 reasons)

(b) What causes the sea to look green near the shore?

D.3/4.30c 1. Most marine organisms that are of economic importance are located in:
(a) open ocean
(b) brackish water
(c) near land
(d) in the depths

Give three reasons for your choice.

2. Most marine organisms of economic importance are located near land. Of the 4 reasons given below, place a check beside three that support this statement.

_____ a. There are a great many edible fish located off shore.
_____ b. Corals have built foundations of islands.
_____ c. Octopus is a delicacy.
_____ d. Clams and oysters are formed off many shores.

A.2/4.30d No test item submitted.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.30 Topic: Marine Communities

Subtopic/Specifications/Content Number	*Test Item*

A.2/4.30e 1. State how the following animals are adapted to life as a bottom-dwelling animal:
A. Starfish
B. sea cucumber
C. hermit crab

2. Match the bottom-dwellers in Column A with their particular adaptation to their environment located in Column B. Write the letter of the adaptation beside the animal that it matches.

Column A	Column B
_____ 1. starfish	A. tentacles
_____ 2. octopus	B. spines, five teeth and pinchers
_____ 3. sea urchin	C. tube feet

A.2/4.30f No test item submitted.

A.2/4.30g 1. Select any three organisms from the following list and describe in a paragraph how each has adapted to the changing conditions of tidal fluctuations: barnacle, limpet, starfish, sea urchin, clam, mussel.

Subordinate Test Item

1. Tidal fluctuations cause many animals along the shore to be exposed to many abrupt changes in the environment. Place a check beside those changes that take place because of rising and falling tides.
_____ a. flooding
_____ b. overcrowding
_____ c. baking
_____ d. freezing
_____ e. drying

A.2/4.30h No test item submitted.

B.1/4.30i 1. Make a food chain involving at least 4 marine organisms that live in the intertidal zone of the ocean.

2. Write a 4 link food chain that could be found in a tide pool or on a sandy beach.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.30 Topic: Marine Communities

Subtopic/Specifications/Content Number	*Test Item*

A.3/4.30j 1. If the following organisms live in fresh water, put an F in the blank in front of the name; if it lives mainly in the ocean, put an O in the blank. It is possible for some to live in more than one habitat.

_____	1. whale	_____	11. kelp
_____	2. frog	_____	12. clam
_____	3. algae	_____	13. oyster
_____	4. zooplankton	_____	14. water lilies
_____	5. reeds	_____	15. snails
_____	6. crabs	_____	16. trout
_____	7. marsh grass	_____	17. starfish
_____	8. bass	_____	18. worms
_____	9. diatoms	_____	19. sea cucumber
_____	10. cattails	_____	20. barnacles

D.3/4.30k No test item submitted.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Objectives (*Minimum Objectives)	Activities	References
The student will:		
*B.1/4.40a Given an outline of the United States including Alaska and Hawaii, accurately locate the major land zones: desert, tundra, arctic, tropic, and temperate zones.		
*D.3/4.40b Conclude that the determinants of the five major land zones are altitude, latitude, and rainfall.		
*A.2/4.40c From a given list of land organisms, select at least 5 (include both plants and animals) representing all 5 major land zones and explain how each is able to live where it does in terms of its tolerances and needs for light, temperature, and moisture as provided in its habitat.		
*A.2/4.40d To demonstrate an understanding of the statement, "Organisms in wet areas around ponds and marshes are well suited to life both in water and on land," cite at least 3 organisms (plant and animal) that live in this manner and state how each has adapted to such an existence.		
*A.3/4.40e From a given list of plants, select those that are well adapted to a bog soil deficient in minerals and nitrogen by virtue of being carvivorous to show that, although marsh (bog) soil is lacking in minerals, various plants can survive there.		
*A.2/4.40f As a result of learning that forest communities provide ample food and moisture for a variety of plants and animals within the soil, demonstrate knowledge of organisms with suitable adaptation to this habitat by listing 4 plants and 6 animals commonly found there.		
A.2/4.40g Characterize soil organisms as being adapted to darkness, lack of moisture, and having impediments to locomotion.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Objectives (*Minimum Objectives)		Activities	References
	The student will:		
*A.2/4.40h	Indicate a familiarity with the concept, "Forest communities provide ample food and moisture with protective cover for a variety of organisms, by charting (or other written form) at least two examples each of birds, mammals, insects, amphibians, and reptiles in terms of food and protective covering required by each and provided in the forest.		
*A.2/4.40i	To further indicate an understanding of the previous concept in terms of plant variety, describe three forest-dwelling trees that differ in their adaptation to a need for light in terms of amount of light required and adaptation to this need.		
*A.2/4.40j	Demonstrate the understanding that life forms of the deserts and grasslands must adapt to having little water and great temperature extremes by stating the special adaptations of form structure, physiology, or way of life that permits living things to adjust to these two environmental factors.		
A.2/4.40k	Given a list of environments where living conditions do not appear favorable (caves, isolated islands, remote rock formations, above snowline of mountains, cracks in sidewalk, etc.) cite at least three examples of living things inhabiting these environments and state the adaptation(s) they have developed to survive.		
*D.3/4.40l	Conclude that environmental conditions vary more on land than in water by giving at least five reasons that lend support to this conclusion.		
*B.1/4.40m	Make a food web (drawings or listings) depicting the interrelationships among life forms found for each of the 5 major land zones.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number	*Test Item*

B.1/4.40a 1. Below is an outline of the United States including Alaska and Hawaii, accurately locate the major land zones: desert, tundra, arctic, tropic, and temperate zones.

The teacher provides map of U. S., including Alaska and Hawaii.

Subordinate Test Item
1. List five major land zones.

D.3/4.40b 1. The factors that determine land zones would include:
A. altitude; longitude
B. altitude; longitude; winds
C. altitude; latitude; rainfall
D. altitude; latitude

2. What three factors determine land zones? _____, _____, _____.

Subordinate Test Items
1. Matching: Match the terms to the definitions and write the proper letter in the blank:

_____ 1. latitude	A.	an imaginary line drawn around the earth halfway between the poles.
_____ 2. altitude	B.	a measure of position above sea level from the earth's surface
_____ 3. raintall	C.	a measure of distance between the equator and one of the poles
_____ 4. equator	D.	a measure of moisture in an area, in inches/year

2. Compare the land zones below in terms of : temperature, rainfall, latitude and altitude.
Land Zones:
1. Desert -

2. Tundra -

3. Arctic -

4. Tropic -

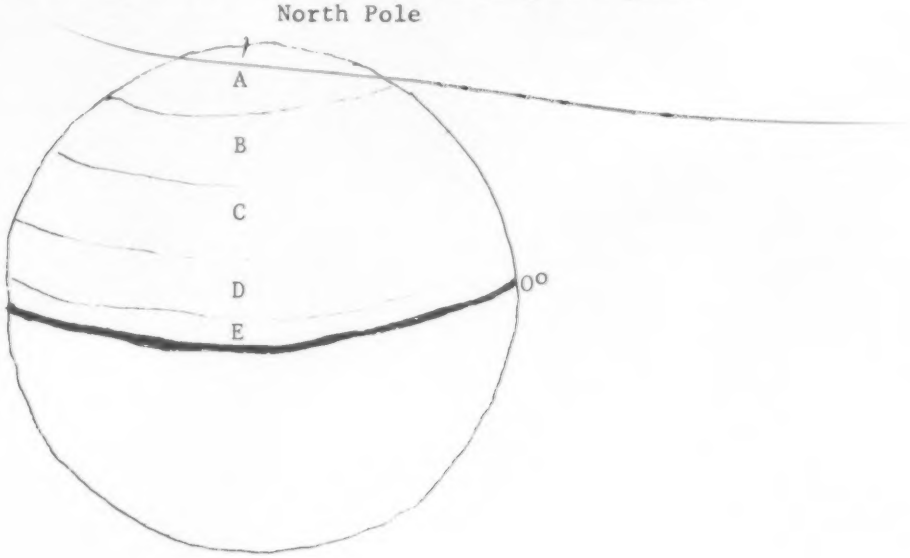
5. Temperate -

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number	*Test Item*

3. Matching: Match the terms to the correct zone on the drawing of a globe.

1. temperate
2. tropic
3. desert
4. arctic
5. tundra



A.2/4.40c 1. From this list of organisms choose one for each land zone that we have studied. Then tell how each is able to live in its environment. Include such things as its (a) tolerances for temperature; (b) need for light and (c) need for moisture:

(a) cactus
(b) lichen
(c) kangaroo rat
(d) arctic hare
(e) arctic fox
(f) oak tree
(g) seals
(h) aerial plants
(i) buffalo

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number	*Test Item*

Subordinate Test Item

1. Matching: Below are listed descriptions of living things. Match each to the land community you think it would be best adapted for. You may choose more than one community for each organism. In the blanks on your paper, write out the name or names of the communities you choose.
   Choose from these communities:
   desert, forest, tropic, arctic, tundra, grassland

   _____ 1. a plant that can store water in roots and stems.
   _____ 2. an animal that hibernates in winter.
   _____ 3. an animal that can glide from tree to tree.
   _____ 4. a plant with very shallow roots and a short life cycle.
   _____ 5. an animal that gets all of the water it needs from eating seeds and fruits, and excretes very concentrated urine.
   _____ 6. a plant that grows best in warm, wet, dark places.
   _____ 7. a large grazing animal that needs room to wander.
   _____ 8. a bacteria that grows best in cold temperatures.

2. On the chart, mark the area suitable as a habitat or place to live, for which the organism is adapted, for each of the following organisms: IF AN ORGANISM IS NOT SUITED, DO NOT WRITE ITS NAME.

A. Polar Bear	B. Sloth or Ai	C. Raccoon	D. Arctic Fox
E. Woodpecker	F. Humming-bird	G. Gull	H. Blue Crab
I. Lichen	J. Mountain Goat	K. Hornbill	L. Ant
M. Caribou	N. Fungi	O. Snake	

   Teacher should provide chart showing what land zones are located at what altitude.

3. Sample Multiple Choice
   (a) A willow would not be able to live on a desert like a cactus plant because it requires more (a) temperature, (b) light, (c) moisture.

   (b) A rose bush would not be able to live on a desert like a cactus plant because it requires more (a) light, (b) moisture, (c) warmer temperature, (d) none of the above.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number	*Test Item*

A.2/4.40d 1. List 1 plant and 2 animals that are well suited to life both in water and on land and state how each has adapted to such an existence.

A.3/4.40e 1. Place a check (✓) in front of those plants that are well adapted to a bog soil deficient in minerals and nitrogen because they are carnivorous.

_____ sundew
_____ fern
_____ venus flytrap
_____ oak tree
_____ pitcher plant

Subordinate Test Item

1. What is a carnivorous plant?

2. Bogs are deficient in _____ and _____.

3. Plants well suited to a bog environment are able to survive because _____ _____.

A.2/4.40f 1. List 4 plants and 6 animals that you might see on a bike ride through a forest.

A.2/4.40g 1. Which of the following would be adaptations of animals that live in the soil?

A. lack of moisture
B. darkness
C. little movement
D. all of these
E. none of these

Subordinate Test Item

1. Give characteristics of centipedes for existence in a soil community.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number — *Test Item*

A.2/4.40h 1. During our study of the forest we stated that "the forest provides food, moisture and protective cover for many animals." Show this statement to be true by filling in the following chart.

A. First give 2 examples of birds, mammals, insects, amphibians, and reptiles found in a forest environment.
B. Then tell (1) what food is needed and provided in the forest
(2) about the need for moisture and how the moisture is provided
(3) about the protective covering needed and provided by the forest

	Organism	Food Needed and Provided	Moisture Needed and Provided	Protective Covering Needed and Provided
Birds	1.			
	2.			
Mammals	1.			
	2.			
Insects	1.			
	2.			
Amphibians	1.			
	2.			
Reptiles	1.			
	2.			

A.2/4.40i 1. List three forest dwelling trees that differ in their adaptation for a need for light. Give the adaptation of each.

Subordinate Test Item
1. Pines and hemlocks grow slower than many forest trees. Also, they are more tolerant of shade than many other forest trees. How could this tolerance to shade by of adaptive value, considering that these trees grow so slowly?

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number	*Test Item*

A.2/4.40j 1. State the way that each of the following have adapted to the low water supply and great temperature extremes of the deserts and grasslands:

rye grass
cactus
iguana
prairie dog
kangaroo rat
coyote

A.2/4.40k 1. The following are considered to be unfavorable environments for life: cave, isolated islands, remote rock formations, above the snowline ot mountains, and sidewalk cracks. Select any 3 environments and complete the following chart for each.

Environment	Organism Living In Environment	Adaptation of Organism To Environment

D.3/4.401 1. In the following sentence circle the correct answer: "Conditions of the environment vary more on (water; land)" State at least 5 reasons that support your choice.

2. Select the correct statement and give 5 reasons for your choice.

A. There is no way to compare environmental conditions on land and in water.
B. Land communities show more variations in environmental conditions than water communities do.
C. Water communities whow more variations in environmental conditions than land communities.

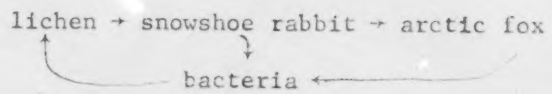
B.1/4.40m 1. Make a food web by drawing or listing plants and animals for each ot the following land zones:
A. desert
B. tundra
C. arctic
D. tropic
E. temperate

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.40 Topic: Land Communities

Subtopic/Specifications/Content Number	*Test Item*

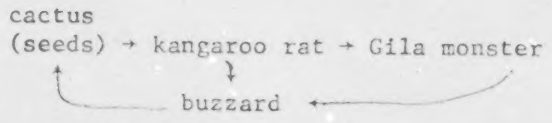
Subordinate Test Item

1. This food chain would most likely be for which community?



A. desert
B. tropic
C. tundra
D. temperate

This food chain would most likely be for which community?



A. desert
B. tropic
C. tundra
D. temperate

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.50 Topic: Community Changes

*Objectives (*Minimum Objectives)*		*Activities*	*References*
	The student will:		
*D.3/4.50a	Conclude that communities do change by supporting this conclusion with at least three examples of changes that occur in communities.		
*B.1/4.50b	Compare in writing hibernation, dormancy, estivation, molting, and migrating by stating the habits of at least one organism that illustrate each.		
B.1/4.50c	Show support for the fact that organisms cause changes in their habitat by drawing or stating in writing how at least two organisms other than man have altered the conditions of their habitat.		
*B.1/4.50d	Arrange in proper order the successional changes which occur in at least ponds and woodlands.		
*A.2/4.50e	Cite at least three causes of successional changes in ponds and woodlands.		
*A.1/4.50f	Show an understanding of what is meant by a climaxed community by defining what such a community is and giving at least two examples that illustrate the definition.		
*A.2/4.50g	Cite ways in which living things change daily with regard to changes in light intensity, tidal flow, temperature, etc.		

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.50 Topic: Community Changes

Subtopic/Specifications/Content Number	*Test Item*

D.3/4.50a 1. In the following sentence circle the correct answer: "Communities (do; do not) change. Give 3 reasons to support your answer.

Subordinate Test Item

1. In 1900, there existed a bare field. Later in 1950, the field was no longer bare, but supported tree seedlings and bushes. Fifty years later the field had become a forest. Which of the following is correct about the above community. (a) communities remain the same, (b) communities change suddenly, (c) communities are in a gradual state of change, (d) none of the above.

B.1/4.50b 1. Match following behaviors in Column I with the definitions in Column II. Then match the organisms in Column III with the correct behavior.

Column I	Column II	Column III
_____ _____ Hibernation	a. sheding skin, feathers, etc.	1. Birds
_____ _____ Dormancy	b. inactive in summer	2. chickens
_____ _____ estivation	c. inactive in winter	3. horses
_____ _____ molting	d. moving from place to place with the change of season	4. bears
_____ _____ migration	e. inactive all spring	5. frogs

B.1/4.50c 1. Show by writing or through drawings how 2 organisms other than man have altered the conditions of their habitat.

B.1/4.50d 1. The teacher will provide 4 pictures illustrating successional changes in a pond and 4 pictures illustrating successional changes in a woodland.
Examine the pictures below. Using the numbers 1-4, indicate the correct sequence to show which changes occurred 1st, 2nd, 3rd, & 4th in the pond. Do this also for the woodland.

Subordiante Test Item

1. Explain what is meant by "successional changes" by giving a sentence definition and an example that illustrates your definition.

A.2/4.50e 1. Which of the following is a cause of community change: (a) organisms in the community, (b) seasonal change, (c) climate, or (d) all of the above.

4.00 UNIT: EXPLORING DIFFERENT ENVIRONMENTS
4.50 Topic: Community Changes

Subtopic/Specifications/Content Number	*Test Item*
A.1/4.50f	No test item submitted.
A.2/4.50g	No test item submitted - 1 Subordinate Test Item submitted

Subordinate Test Item

1. If you observed a small stream and surrounding forest area in the mountains of north-west Virginia, composed of mostly hardwoods, describe and list what would happen during a whole year for at least five members of the community from this list: (the community would contain <u>at least</u> these members)
ground hog, oak, maple, aspen, caterpillar, grass, snake, fungi, hawk, frog, trout, wood-duck, fresh-water plankton, grass, mouse, bee, clover, humming-bird.

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.10 Topic: Upsetting the Balance of Nature

Objectives (*Minimum Objectives)		Activities	References
	The student will:		
*A.2/5.10a	Given a particular habitat or community, point out or list the possible upset in balance of populations for that particular example in terms of the life-forms response to man's: (1) adding materials or poisons to the system, (2) taking away essential elements, members, or species, and (3) causing a change(s) in the physical environment.		
A.2/5.10b	Demonstrate an understanding of the statement, "Continued increase in human population has placed increasing demands upon the environment" by listing at least four effects of increased human population on the natural world.		
A.2/5.10c	Cite at least three historical instances of man's increased use of the environment, endangering existing populations.		
B.1/5.10d	Match at least five diseases with the appropriate technological advance which influenced population growth.		

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.10 Topic: Upsetting the Balance of Nature

Subtopic/Specifications/Content Number	*Test Item*
A.2/5.10a	1. In a paragraph explain how the balance of nature can be upset by the following: (1) adding materials or poisons, (2) taking away essential elements, (3) a change in the physical environment.
	2. When a small village becomes a city, what happens to the village in terms of: A. what materials or poisons are added B. what materials, plants, or animals are taken away C. what changes are made in the physical environment
	Subordinate Test Item 1. Sample Questions (a) Show with specific relationships and examples how pollution may upset the balance of nature. (b) Describe what happened when man introduced rabbits into Australia in the 1930's. (c) What is "The Balance of Nature"?
	2. Sample Multiple Choice Which of the following would be the result if man used DDT to rid his garden of certain insects that are harmful to his plants. (a) He would kill both helpful and harmful organisms, (b) he would kill only the harmful, (c) he would kill only the helpful organisms, (d) none of the above.
A.2/5.10b	1. Cite at least 4 needs or problems which may result from a continued increase in human population.
	2. Continued increase in human population has placed increasing demand upon the environment. Place a check beside each item below that is an outcome of increased human population. ____ a. increased income ____ b. increased need for energy, resource or raw material ____ c. increased industrialization and manufacturing ____ d. increased building of cities ____ e. increased food supply ____ f. increased land use

LIFE SCIENCE

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.10 Topic: Upsetting the Balance of Nature

Subtopic/Specifications/Content Number	*Test Item*

Subordinate Test Item

1. Choose one of the following statements and explain how increase in human population has placed increasing demands upon our environment:
   a. Increased need for energy, resource or raw material.
   b. Increased needs for food.
   c. Increased industrialization and manufacturing.
   d. Increased building of cities and manufacturing.
   e. Increased land use.

A.2/5.10c 1. From our study of man's past misuse of the environment briefly describe man's actions in these situations:
   a. the grasslands and the buffalo
   b. the forest and the decline of the Ivory-billed woodpecker
   c. dams and the decline of the Atlantic Salmon runs
   d. the eastern forests and the decline of the Fisher

2. Of the items listed below, check those that are historical instances of man's use of more and more of the environment, endangering existing populations.
   _____ a. the grasslands and the buffalo
   _____ b. destruction of eastern forests and decline of the Fisher
   _____ c. cutting of virgin forests and decline of the Ivory-billed woodpecker
   _____ d. the domestication of the horse
   _____ e. increase of urbanization and decrease of Lynx or Bobcat in Virginia

B.1/5.10d 1. Matching

Disease	Technological Advance
_____ malaria	a. vaccinations
_____ dysentery	b. sanitation
_____ yellow fever	c. control of milk supplies
_____ typhoid	d. control of the mosquito
_____ polio	e. control of the tsetse fly
_____ sleeping sickness	f. improved medical and prenatal care
_____ tuberculosis	
_____ rickets	
_____ smallpox	
_____ survival of the newborn	

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Objectives (*Minimum Objectives)		Activities	References
5.21 Water			
	The student will:		
*A.2/5.21a	Cite the main sources of water pollution as being land run-off after rains, sewage, human wastes, and industrial wastes.		
*B.1/5.21b	Choose from a list of possible actions those most effective in making water supplies usable. (Secondary sewage treatment, eliminate dumping of untreated industrial waste, control of temperature of effluents, farming and planting practices to prevent run-off and erosion)		
A.2/5.21c	List at least 4 reasons for increased amounts of water needed for cities.		
*A.2/5.21d	Give the effects of various pollutants upon water supplies and natural stream populations.		

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Subtopic/Specifications/Content Number		*Test Item*
5.21 Water		
A.2/5.21a	1.	Give 3 main sources of water pollution.
	2.	The one that does not represent a main source of water pollution below is: A. Industrial wastes including oil B. Sewage and human wastes C. Land run-off after rains D. Melting of artic glaciers
B.1/5.21d	1.	Of the following actions choose those that are most effective in making water supplies usable: A. secondary and territory sewage treatment B. seminate dumping of industrial waste C. control of temperature ot effulents D. farming and planting practices that prevent run-off and erosion E. prevent collecting of rainwater F. all of the above G. none of the above
A.2/5.21c	1.	List four reasons for increased amounts of water needed by cities. Subordinate Test Item 1. It has been estimated that by the 1980's, the need for clean water would be greater than the supply. Which of the following would be a possible reason? (a) increased evaporation, (b) increased drainage, (c) increased human population growth, (d) none of the above.
A.2/5.21d	1.	State four possible dangers or problems to our water resources as a result of pollution. Subordinate Test Item 1. Sample Questions (a) Why may pesticides and insecticides be very harmful to the environment if not used carefully? (b) Describe the effects of too many organic wastes on microscopic organisms. How does this effect the oxygen balance of a stream?

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Objectives (*Minimum Objectives)	*Activities*	*References*
5.22 Air		
The student will:		
*A.2/5.22a State main sources of air pollution as: industrial waste, motor vehicle exhaust, and burning materials in the form of gases, smokes, vapors and dust.		
*A.2/5.22b Cite at least the following as due to air pollutants: (a) plant damage, (b) smog deaths, (c) disease, (d) damage to property, and (e) increased cleaning bills.		
*A.2/5.22c List at least four ways by which air can be conserved.		

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Subtopic/Specifications/Content Number	*Test Item*
5.22 Air	

A.2/5.22a 1. List the main sources of air pollution.
1. 3.
2. 4.

2. Choose the 3 greatest polluters of our air.
1. car exhaust
2. burning of garbage by cities
3. industrial smoke
4. burning leaves
5. fumes from home furnaces

A.2/5.22b 1. List at least 5 problems that may be caused by air pollution.

Subordinate Test Item

1. Choose 3 of the following that can be caused by air pollution.
1. disease
2. polluted rivers
3. smog deaths
4. starvation
5. plant damage

2. Sample Multiple Choice
(a) Drivers become sleepy and careless on the road because of the (a) hydrocarbons, (b) oxygen, (c) smog, (d) carbon monoxide in the air.

(b) One disease which has been on the rise because of air pollution is (a) smallpox, (b) lung cancer, (c) flu, (d) common colds.

A.2/5.22c 1. Which of these will conserve the air?
1. pollution free engines
2. use electric powered engines
3. stop home furnaces
4. control of smokestacks
5. stop burning leaves
6. stop breathing
7. plant more green plants

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Subtopic/Specifications/Content Number	*Test Item*
5.22 Air	

Subordinate Test Items

1. Sample Multiple Choice

(a) One way to cut down on carbon monoxide pollution is to (a) stop building refineries, (b) limit gasoline supplies, (c) stop open burning, (d) limit traffic in the cities.

(b) Air pollution can be controlled by (a) dust collectors, (b) cooling towers, (c) a and b, (d) none of these.

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Objectives (*Minimum Objectives)		Activities	References
5.23 Land			
	The student will:		
*B.1/5.23a	From a list of resources, identify each as being renewable or non-renewable.		
*B.1/5.23b	State how man's misuse of these renewable and non-renewable resources will restrict his ability to function effectively in his environment.		
B.1/5.23c	Explain how one of the following can be used to prevent soil erosion: (a) contour plowing, (b) strip and rotation cropping, (c) cover crops, and (d) reforestation.		
A.2/5.23d	Cite at least three problems caused by industrial and agricultural organic and inorganic chemical wastes.		
A.2/5.23e	Describe at least two ways that industrial and agricultural organic and inorganic chemical wastes can be recycled.		
A.2/5.23f	List at least two advantages and two disadvantages of disposing of radioactive wastes in salt beds or mountains, etc.		

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Subtopic/Specifications/Content Number	*Test Item*

5.23 Land

B.1/5.23a 1. In the following list of natural resources, identify each item as (1) renewable, or (2) non-renewable. Write the word on the line provided.

_____ 1. iron
_____ 2. air
_____ 3. uranium
_____ 4. people
_____ 5. coal
_____ 6. sunshine
_____ 7. water
_____ 8. fuel oils
_____ 9. soil
_____ 10. trees

B.1/5.23b No test item submitted.

B.1/5.23c 1. Tell how one of the following can prevent soil erosion:
A. contour plowing
B. strip and rotation cropping
C. cover crops
D. replanting forest

Subordinate Test Item
1. Which of the items below are methods of conserving land?
1. hill plowing
2. tree planting
3. crop rotation
4. contour plowing
5. leaving land bare
6. burning the cover plants

2. Farmers can help conserve soil by:
a._____
b._____
c._____
d._____

A.2/5.23d 1. Discuss 3 pollution problems caused by industrial and agricultural organic and inorganic chemical wastes.

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Subtopic/Specifications/Content Number	*Test Item*
5.23 Land	
A.2/5.23e 1.	Describe two ways man can recycle industrial and agricultural organic and inorganic wastes.
A.2/5.23f 1.	List at least 2 advantages and 2 disadvantages of disposing of radioactive wastes in salt beds or mountains.

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Objectives (*Minimum Objectives)	Activities	References
5.24 Noise		
The student will:		
*B.3/5.24a Describe the possible harm to oneself or others resulting from each at least two sources of noise pollution.		
D.3/5.24b Propose at least one solution to the problem of noise pollution.		
*B.1/5.24c Given a map of the city of Nortolk, locate or place an indication on the map of at least one site for each of the following: air pollution source, water treatment plant, area of water pollution, land pollution, and noise pollution.		

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.20 Topic: Pollution

Subtopic/Specifications/Content Number		*Test Item*
5.24 Noise		
B.3/5.24a	1.	List 2 sources of noise pollution. Explain how noise pollution can be harmful to living things.
D.3/5.24b	1.	Propose at least one kind of law to limit noise pollution.
	2.	A possible corrective measure of amplified speakers sending out loud music is to (a) reduce the current, (b) lower the volume, (c) reduce the amperage, (d) reduce total vibration.
B.1/5.24c		No test item submitted.

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.30 Topic: Wildlife

*Objectives (*Minimum Objectives)*		*Activities*	*References*
	The student will:		
*B.3/5.30a	Give an example for each of the following conservation practices by listing at least one instance where it has been used or accomplished in Virginia: Wildlife conservation by preservation of the natural environment, enforcement ot game and fishing laws, and restocking.		
B.3/5.30b	Explain in a short paragraph at least 3 reasons why fish and game laws are necessary and helpful.		
A.2/5.30c	Compile a list of at least five protected animals or plants.		
A.2/5.30d	Cite at least three instances of total or near extinction due to the influence and carelessness of man and state exactly how man interferred for each example given.		

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.30 Topic: Wildlife

Subtopic/Specifications/Content Number	*Test Item*

B.3/5.30a 1. Match conservation practice with instance or animal.

a. Preservation of natural environment
b. Enforcement of game or fishing laws
c. Restocking

_____ 1. Back Bay Refuge
_____ 2. Jefferson Forest
_____ 3. Seashore Natural Area
_____ 4. beaver
_____ 5. trout
_____ 6. elk
_____ 7. wild turkey
_____ 8. quail
_____ 9. white-tailed deer
_____ 10. weighing station

Subordinate Test Item

1. List three or more examples of conservation in the state of Virginia which has helped to save or preserve the natural environment and our endangered species.

2. After viewing the film "Operation Wildlife", list at least one example of hunting laws, restocking, and preservation of natural environment in Virginia affecting each of these species: (a) beaver, (b) white-tailed deer, (c) trout, (d) Snow Goose, (e) Wild Turkey, (f) quail.

3. One Sunday in December, Mary and her family visited Back Bay Wildlife Refuge in Virginia Beach, which was established for the protection of endangered species. (a) Give at least three (3) species that she probably saw there and tell why it is necessary to have a game refuge with laws governing its use by people, and (b) where they (species mentioned in (a)) live in the summer and why they are found there in December.

B.3/5.30b 1. Explain in a short paragraph three reasons game laws are necessary and helpful.

Subordinate Test Item

1. Give at least two examples of what happened in the past (during the 1800's and early 1900's) in the Atlantic Coastal Area of the U. S. to bird species which were hunted for sport and food, without any sort of control or laws governing hunting.

LIFE SCIENCE

5.00 UNIT: MAN AND HIS ENVIRONMENT
5.30 Topic: Wildlife

Subtopic/Specifications/Content Number		*Test Item*
A.2/5.30c	1.	List 5 animals and plants that are protected by law.
A.2/5.30d	1.	State 3 examples of man's being careless and causing near extinction of a species. Tell exactly what action of man (almost) caused the extinction.